

NOTES ON DAVALLIACEAE II.¹ A REVISION OF THE GENUS DAVALLIA

H. P. NOOTEBOOM

Rijksherbarium / Hortus Botanicus, P.O. Box 9514, 2300 RA Leiden, The Netherlands

SUMMARY

This revision of *Davallia* starts with a chapter about the morphology of the genus. In *Davallia* two sections are recognized, section *Davallia* and the new section *Scyphularia*. The species formerly belonging to *Araiostegia*, *Humata* and/or *Pachypleuria* are incorporated in *Davallia*. Thirty-four species are described, with one new, *Davallia rouffaeriensis*, and five new combinations or states are made. Keys to the genera (of the family Davalliaceae) and the species (of *Davallia*) are given. An index to all treated species (and their synonyms) is given.

MORPHOLOGY OF DAVALLIA

Scales

The scales can be peltate or basally attached with a cordate, overlapping base (sometimes called pseudo-peltate). Because the base is very thin and overlapping this condition is easily overlooked.

Although some authors regard basifixed scales as important for recognizing genera (*Araiostegia* was recognized almost solely on this character), I came to the conclusion that the character, probably primitive, occurs almost at random within the family. Sometimes species that are very similar to each other, and probably closely related, differ in this character, e. g., *Davallia embolostegia* and *D. denticulata* var. *elata*. In a few collections, maybe hybrids, this is the only difference separating them!

The scales are basifixed with greatly overlapping cordate base in the following species: *Davallia clarkei*, *D. divaricata*, *D. embolostegia*, *D. hymenophylloides*, *D. multidentata*, *D. pulchra*. (*Davallia clarkei*, *D. hymenophylloides*, *D. multidentata* and *D. pulchra* were formerly placed in *Araiostegia*, a genus with some of the characters of *Humata* or *Pachypleuria*, such as much divided leaves and only basally attached indusia, but with basifixed scales.)

Another diagnostic character is the shape of the scales. In *Davallodes* (except *D. membranulosum*, which I include here in *Davallia*), and in the formerly recognized genera *Parasorus*, *Scyphularia*, and *Trogostolon* they are acicular. This means that, from a round base, the scales abruptly taper into a very narrow, thread-like, distal part that is mostly curved outwards above the appressed base. Kato (1985) has already explained that acicular and non-acicular scales are not different morphologically

¹) The first paper in this series, 'Notes on Davalliaceae I', was published in *Blumea* 37 (1992) 127–185.

(nor, according to him, taxonomically). I agree to some extent with him. All species of *Davallodes* possess acicular (or nearly acicular) scales but they are not unique to this genus. In *Davallia* the scales are flat and nearly acicular in some species (*Davallia denticulata*, *D. heterophylla*, *D. speciosa*, and *D. trichomanoides*); this condition may occur together with normal, gradually tapering scales as in *D. denticulata*. Acicular scales occur in *D. pentaphylla*, *D. triphylla* (together the former genus *Scyphularia*), *D. seramensis*, and *D. undulata* (*Parasorus undulatus*). In my opinion these four species together form the section *Scyphularia*. *Davallia undulata* differs from all the other species of the family in having a coenosorus. The only species of *Davallia* outside *Scyphularia* with acicular scales is *D. falcinella* (formerly *Trogostolon falcinella*). Another type of scales, much resembling the gradually tapering scales, occurs in *D. solida*, and, together with nearly acicular scales, in *D. trichomanoides*. These scales are evenly narrowed towards the apex above the much broader base. This form may be a transition between acicular and evenly narrowed scales.

The occurrence of apical and marginal multicellular hairs on the scales is often also considered an important character, for instance in *Davallia brevipes*, *D. canariensis*, *D. graeffei*, *D. leptocarpa*, *D. pectinata*, *D. repens*, *D. solida*, *D. triphylla*, and *D. wagneriana*. These species have peltate scales in common, but vary in other characters such as attachment of indusium and shape of the scales.

Indusia

The indusia can be reniform, attached only at the narrow, cordate base, or attached at a broad base and hardly or not at all at the sides, attached at the base and only part of the sides, or attached at the base and along the sides (i.e. pouch-shaped). It is clear that the different conditions are transitional and difficult to use for separating genera. The former genus *Humata* was mainly characterized by having only basally attached indusia. Species with only basally attached indusia are *Davallia angustata*, *D. assamica*, *D. brassii*, *D. clarkei*, *D. heterophylla*, *D. hymenophylloides*, *D. membranulosa*, *D. multidentata*, *D. parvula*, *D. pectinata*, *D. pulchra*, *D. repens*, *D. rouffaeriensis*, *D. sessilifolia*, and *D. sessilifolioides*. Species with indusia attached at the base and part of the sides are *Davallia corniculata*, *D. falcinella*, *D. griffithiana*, and *D. speciosa*. Species with pouch-shaped indusia are *Davallia brevipes*, *D. canariensis*, *D. corniculata*, *D. denticulata*, *D. divaricata*, *D. embolostegia*, *D. graeffei*, *D. leptocarpa*, *D. pentaphylla*, *D. seramensis*, *D. solida*, *D. trichomanoides*, *D. triphylla*, *D. wagneriana*, and *Davallodes hirsutum*. It is noteworthy that in *Davallia corniculata* indusia may have the sides either partially or completely attached.

Leaf shape, hairiness and insertion of pinnules

The incision of the leaves is very diverse. It varies from an entire leaf to a compound leaf with uni-veined ultimate segments. In one species, *Davallia repens*, both undivided and compound leaves occur, in fertile as well as in sterile leaves.

In the small group that forms the section *Scyphularia* undivided and imparipinnate leaves occur together with acicular scales.

Compound leaves are generally deltoid and broadest towards the base. In *Davallia membranulosa* and *D. assamica*, however, they are elongate and not broader, sometimes even narrowed, towards the base, a character also occurring in *Davallodes*.

The pinnules in *Davallia* are anadromous, i.e., the apical pinnule of at least the lower pinnae is inserted nearer to the rachis than the basal pinnule; the alternative condition is termed catadromous (in *Davallodes* the pinnules are essentially catadromous). In *Davallia membranulosa* they are more or less opposite (anadromous to catadromous). Kato (1985) and I myself (Nootboom, 1992) included this species in *Davallodes*. *Davallia membranulosa* also possesses hairy leaves and axes, as do all the species of *Davallodes*. But this character occurs in *Davallia* as well, viz. in *Davallia brevipes*, *D. (Araiostegia) multidentata* and sometimes in *D. heterophylla*, *D. pectinata*, and *D. sessilifolia*. The scales of *Davallia membranulosa* are not acicular and I therefore now include this species in *Davallia*. It is probably closest related to *Davallia assamica*.

Sen, Sen & Holttum (1972) describe aerophores in two continuous pale lines on the petiole for *Davallia* and *Humata* and not for *Araiostegia* and *Davallodes*. As they studied only a few species, and this character is obscure in herbarium material, I refrain from evaluating it. Kramer (1990) mentions these aerophores in the description of the family.

Chromosomes

In *Davallia* $x = 40$, in *D. repens* from Sri Lanka triploidy and apogamy is reported (Manton & Sledge, 1954).

Spores (by Gisela Rödl-Linder)

The spores are ellipsoidal with monolete aperture. The exospore is colliculate-verrucate, discretely verrucate, or fused verrucate to porous (the verrucae fused to the extent that the surface appears porous). All transitions occur between the different types, but generally the type is constant for a species or group of species.

In the former genus *Araiostegia* the perispore was described as granulate, contrary to the generally smooth perispore of *Davallia*. However, this character occurs only in one species, *Davallia (Araiostegia) clarkei*. The species of the former genus *Araiostegia* vary in the ornamentation of the exospore in the same way as the species of *Davallia*. Porous spores, which are rare in *Davallia*, do not occur in *Araiostegia*. Because closely related species generally possess the same kind of spores, I doubt whether the former genus *Araiostegia* is monophyletic.

In *Davallia* porous spores are found in *D. heterophylla* together with a transition of fused verrucate to porous, in *D. seramensis*, and in *D. sessilifolia*. In *D. sessilifolioides*, which is closely related to the latter, a transition of fused verrucate to porous spores is found. This type is also found in *D. wagneriana* and *D. corniculata*, two closely related species. In a few collections of the variable *D. repens*, here suspected to show introgression with the latter two species, the same type also is found. The size of the spores of *D. repens* varies between 27 and 46 μm ; that of *D. wagneriana* and *D. corniculata* is c. 27 μm . As there is one apogamous triploid reported, and the size varies throughout the area of distribution, I suppose that hybridizing resulting in triploidy and possibly polyploidy is the cause of the extreme high variability in *D. repens*. The rest of the collections of *D. repens* studied possess fused verrucate spores, which are often transient to the fused verrucate to porous spores. Moreover, this type of spore is found in *D. heterophylla* and *D. undulata*, species that are quite different.

Davallia parvula, a species very near to *D. repens*, has rugate-verrucate spores that show a little more fusion of the verrucae but closely resembles the spores of *D. repens*. they fall within the variability of *D. repens* in size and ornamentation. This type is also found in the distinct *D. pectinata*. Many species possess colliculate-verrucate spores, which are rather constant for a species although transitions may be found within one collection with discrete verrucate and discrete to fused verrucate. In this large group there is no correlation with other characters. *Davallia canariensis* differs from all other species in its distinctly tuberculate verrucae.

KEY TO THE GENERA OF THE FAMILY DAVALLIACEAE

- 1a. Lamina compound. Pinnules of at least the larger pinnae catadromous. Rhizome scales acicular or nearly acicular **Davallodes**
- b. Lamina from simple or imparipinnate to compound. In compound leaves pinnules of at least the larger pinnae anadromous. Rhizome scales acicular or not. In one species (*Davallia membranulosa*) the pinnules are catadromous but the rhizome scales evenly narrowed to the apex 2
- 2a. Lamina compound. Scales basifixed along broad base, roots borne on all sides of rhizome, sori terminal at the vein endings **Leucostegia**
- b. Lamina compound or not. Scales peltate, or basifixed with cordate base and much overlapping lobes, roots restricted to the ventral side of lateral buds, sori facing midveins at the forking point of veins, or facing midveins at the bending point of a vein 3
- 3a. Lamina compound. Sori exindusiate, extra axillary lateral buds intermediate between two succeeding phyllopodia **Gymnogrammitis**
- b. Lamina compound or not. Sori indusiate, extra axillary lateral buds lateral to the phyllopodia, or lower lateral and slightly anterior **Davallia**

Conclusion

From the arguments used above I conclude that the family Davalliaceae counts only four genera, *Davallia*, *Davallodes*, *Leucostegia*, and *Gymnogrammitis*.

It is difficult to divide *Davallia* into sections. There are no clearly definable groups except for section *Scyphularia*, newly defined in this paper with *Davallia pentaphylla*, *D. seramensis*, *D. triphylla*, and *D. undulata* (the numbers 31–34).

In a later paper the generic delimitation will be discussed.

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Note — An identification list of all collections is available from the Rijksherbarium at Leiden. The descriptions in this paper are made with the computer programme DELTA, and the keys with KCONI. A file to be used with ONLIN6 for on-line identification of specimens can be obtained from the author. With the request a 3.5" floppy disk should be sent.

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DAVALLIA

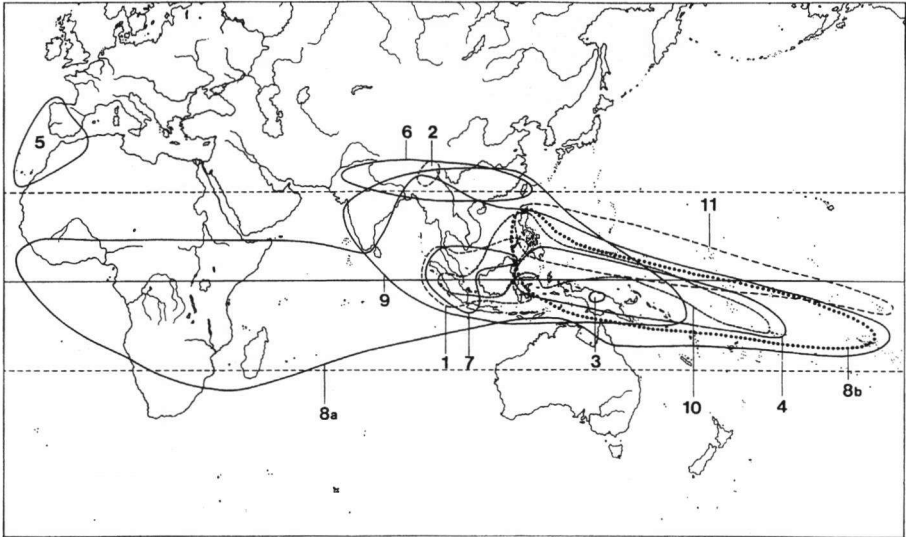
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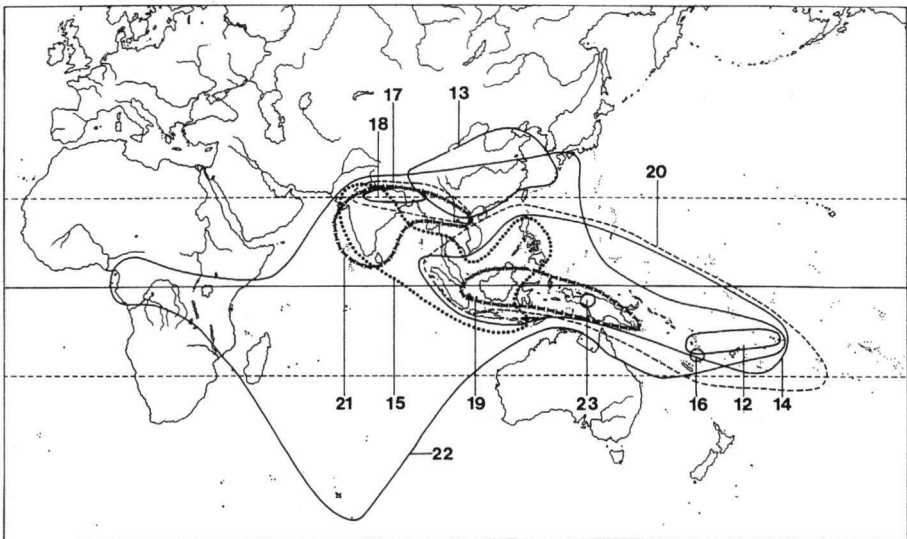
Roots restricted to the ventral side of lateral buds. *Scales* of rhizome peltate or basifixed with cordate base and greatly overlapping lobes, variously shaped: distinctly acicular, or flat and nearly acicular, narrowed evenly towards the apex, or narrowed abruptly from a broad base, or broad, ovate to oblong-subdeltoid with round to acute apex. Petioles usually well developed, in two ranks on the dorsal side of the rhizome; adaxial face sulcate, the groove usually raised in the middle; small species sometimes with subsessile leaves; petiole occasionally persistently scaly. *Lamina* simple, imparipinnate, pinnate + pinnatifid, bipinnate + bipinnatifid, or tripinnate + tripinnatifid; if compound deltoid and broadest towards base or rarely elongate, glabrous or rarely bearing multicellular hairs, anadromous or rarely isodromous or catadromous and then the scales evenly narrowed towards the apex; lamina dimorphic or monomorphic, in dimorphic species with reduced leaf tissue and/or more dissected. Vein endings on sterile segments reaching the margin or not. False veins present in several species. Rhachis winged and therefore seemingly grooved adaxially but convex between the wings. In the dry state (re herbarium specimens) it is difficult to see whether the rhachis itself is grooved or flat. *Sori* typically separate but in *D. undulata* connate and elongate along leaf margins; sori near the margin, facing midveins at the forking point of veins or at the bending point of a vein.

Distribution — From India through continental SE Asia to China, Korea, and Japan; Malesia; the Pacific to Samoa and New Zealand; NE Australia; the islands in the Indian Ocean; Africa; one species in NW Africa, the Canary Islands, and SW Europe. Maps 1–4.

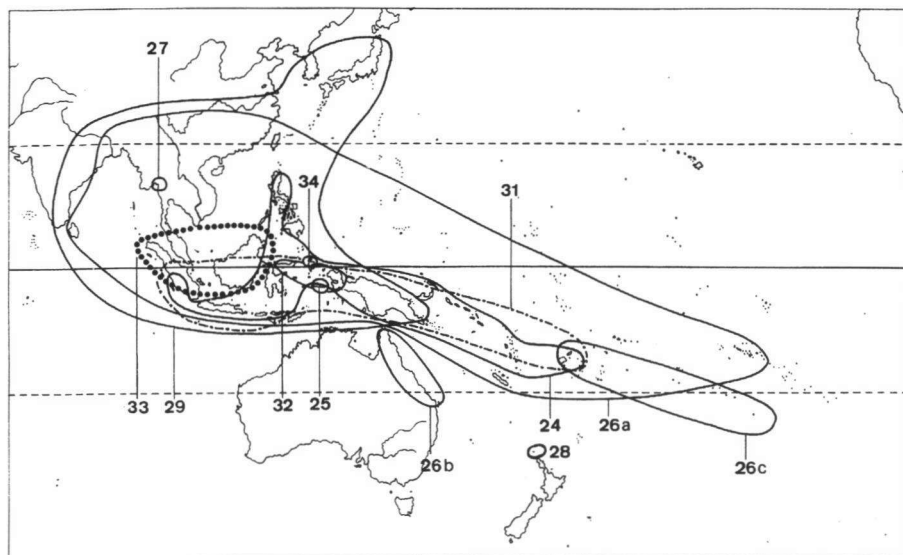
Eight species are restricted to a very small area: *Davallia assamica* to Assam and neighbouring areas, *D. brassii* to a small area around the border of West New Guinea and Papua New Guinea, *D. leptocarpa* to Aneityum in the New Hebrides, *D. rouffaeriensis* to a very restricted area near the Rouffaer River in W New Guinea, *D. ses-*



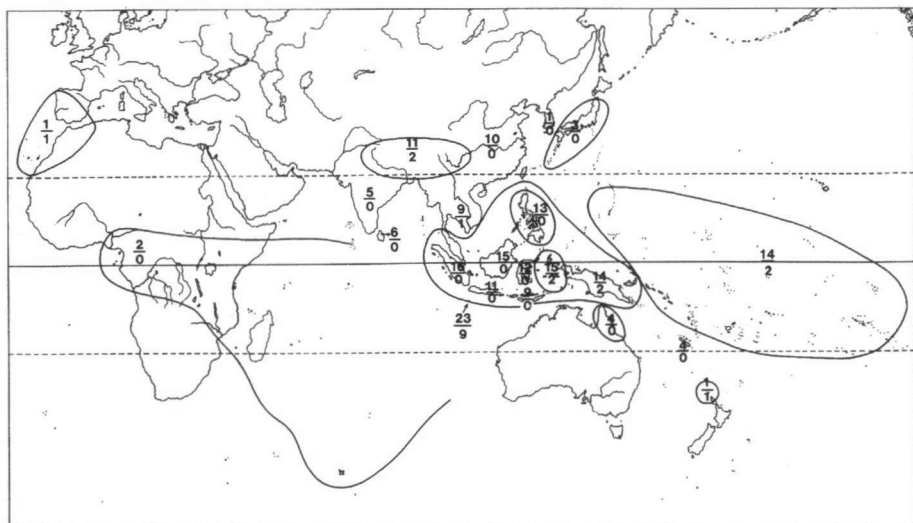
Map 1 — 1. *Davallia angustata* Wall. ex Hook. & Grev. — 2. *D. assamica* (Bedd.) Baker in Hook. & Baker. — 3. *D. brassii* (Copel.) Noot. — 4. *D. brevipes* Copel. — 5. *D. canariensis* (L.) J. Sm. — 6. *D. clarkei* Baker. — 7. *D. corniculata* Moore. — 8a. *D. denticulata* (Burm. f.) Mett. ex Kuhn var. *denticulata*. — 8b. *D. denticulata* var. *elata* (Forst.) Mett. ex Kuhn. — 9. *D. divaricata* Blume var. *divaricata*. — 10. *D. embolostegia* Copel. — 11. *D. falcinella* (J. Sm.) K. Presl.



Map 2 — 12. *Davallia graeffei* Luerksen. — 13. *D. griffithiana* Hook. — 14. *D. heterophylla* J. Sm. — 15. *D. hymenophylloides* (Blume) Kuhn. — 16. *D. leptocarpa* Mett. — 17. *D. membranulosa* Wall. ex Hook. — 18. *D. multidentata* Hook. — 19. *D. parvula* Wall. ex Hook. & Grev. — 20. *D. pectinata* J. Sm. — 21. *D. pulchra* D. Don. — 22. *D. repens* (L. f.) Kuhn. — 23. *D. rouffaeriensis* Noot.



Map 3 — 24. *Davallia sessilifolia* Blume. — 25. *D. sessilifolioides* Kato. — 26a. *D. solida* (Forst.) Sw. var. *solida*. — 26b. *D. solida* var. *pyxidata* (Cav.) Noot. — 26c. *D. solida* var. *fejeensis* (Hook.) Noot. — 27. *D. speciosa* Mett. in Kuhn. — 28. *D. tasmani* Field. — 29. *D. trichomanoides* Blume var. *trichomanoides*. — 30. *D. wagneriana* Copel. (distribution area not given on the map). — 31. *D. pentaphylla* Blume. — 32. *D. seramensis* Kato. — 33. *D. triphylla* Hook. — 34. *D. undulata* (Alderw.) Noot.



Map 4 — Number of species (above the hyphen) and number of endemic species (below the hyphen) for each area.

silifolioides to Ceram (Moluccas), *D. speciosa* to Moulmein in Burma, *D. tasmani* to Three Kings Island, north of New Zealand, and *D. undulata* to Halmaheira and Ternate (Moluccas).

Two species have a very wide distribution, *D. denticulata* from tropical West Africa to the Society Islands in the Pacific and *D. repens* from tropical West Africa to Samoa. The latter species is found as far north as Japan and as far south as the Kerguelen. (The large variability is discussed under this species. Whereas in the outer ranges of its distribution the species is rather constant, it is highly variable in the inner regions where it comes into contact with other species of the genus.)

The majority of the species have a moderately large area of distribution in SE Asia, nine of them extending far into the Pacific: *D. brevipes*, *D. denticulata*, *D. embolostegia*, *D. falcinella*, *D. heterophylla*, *D. pectinata*, *D. pentaphylla*, *D. sessilifolia*, *D. solida*; and *D. leptocarpa* and *D. graeffei* restricted to the Pacific.

The distribution of *D. canariensis*, in northern Africa and southwestern Europe, lies outside the area of the other species of the genus, just as the distribution of *D. tasmani* at the other side of the globe. Nevertheless, both species are so similar that they could be varieties (Maps 1: 5 and 3: 28, respectively).

The recent centre of distribution of the genus (and of the family) is clearly Malesia with 23 of the total 34 species and 9 endemic species. Malesia and the Pacific together possess 16 endemic species. Sumatra contains 16 species, Borneo 14, the Philippines 13, the Moluccas 15, New Guinea 14, but the Pacific also has a large number of species, viz. 14, of which 3 (one in New Zealand) are endemic. The species endemic to Asia north of the Isthmus of Kra in S Thailand number only 7 (Map 4).

The distribution of so many taxa far into the Pacific may be accounted for by the fact that the adverse trade and monsoon winds usually do not blow during sporulation. At that time the winds blow towards the Pacific, at least in the Philippines. *Davallia canariensis* might be a relict from the Eocene. For the distribution of *D. tasmani* an explanation is difficult to find.

KEY TO THE SPECIES OF DAVALLIA

- 1a. Rhizome scales basifixed with cordate base and much overlapping lobes . . . 2
- b. Rhizome scales peltate 8
- 2a. Indusium pouch-shaped, veins in sterile ultimate lobes pinnate, vein endings on sterile segments reaching the margin 3
- b. Indusium reniform or semicircular, attached at the narrow, cordate base only, or attached at the broad base and hardly or not at the sides, veins in sterile ultimate lobes frequently simple or forked, vein endings on sterile segments not reaching the margin 5
- 3a. Indusium upper margin elongated, free, separated from or even with lamina margin or protruding beyond lamina margin, indusium longer than wide
- 10. *D. embolostegia***
- b. Indusium upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin, indusium wider than long or about as wide as long 4

- b. Lamina pinnate with pinnatifid pinnae, glabrous, rhizome scales without pale border 17
- 17a. Rhizome scales often curling backward, brown, pinnae linear-triangular, indusium more or less triangular to rhomboid, 0.4–0.6 by 0.4–0.6 mm
- 23. *D. rouffaeriensis***
- b. Rhizome scales not or seldom curling backward, whitish or red brown, pinnae narrowly ovate, indusium semicircular, 0.7–1 by 0.8–1.2 mm
- 2. *D. assamica***
- 18a. Indusium attached at the base and only part of the sides, or attached at the broad base and hardly or not at the sides 19
- b. Indusium also attached along the sides, pouch-shaped 22
- 19a. Rhizome scales distinctly acicular **11. *D. falcinella***
- b. Rhizome scales narrowed evenly towards the apex or flat and nearly acicular, narrowed abruptly from a broad base 20
- 20a. False veins present, indusium oblong, upper margin elongated, free
- 8b. *D. denticulata* var. *elata***
- b. False veins not present, indusium semicircular, or more or less triangular to rhomboid, upper margin not elongated, truncate or slightly rounded 21
- 21a. Rhizome scales flat and nearly acicular, narrowed abruptly from a broad base, lacking marginal setae or teeth, or those rare, indusium more or less triangular to rhomboid **27. *D. speciosa***
- b. Rhizome scales narrowed evenly towards the apex, with marginal setae at least in distal part, indusium semicircular **13. *D. griffithiana***
- 22a. Scales bearing multiseptate hairs at least when young 23
- b. Scales not bearing multiseptate hairs 25
- 23a. Sori borne several on a segment, ultimate segments 3–17 mm broad
- 26a. *D. solida* var. *solida***
- b. Sori frequently single on a segment, ultimate segments 0.2–2 mm broad . . 24
- 24a. Veins in sterile ultimate lobes pinnate, pinnae rhomboid, longest pinnae 5–10 cm, pinnules or pinna-lobes ovate, margins of lamina of each leaflet thickened and decurrent on the edge of the grooved rhachis **28. *D. tasmani***
- b. Veins in sterile ultimate lobes often simple, pinnae linear-triangular or narrowly ovate, longest pinnae 11–30 cm, pinnules or pinna-lobes narrowly ovate, margins of lamina of each leaflet not thickened . . **26c. *D. solida* var. *fejeensis***
- 25a. Veins in sterile ultimate lobes pinnate, vein endings on sterile segments reaching the margin, sori borne several on a segment 26
- b. Veins in sterile ultimate lobes frequently simple or forked, vein endings on sterile segments not reaching the margin, sori frequently single on a segment . . 27
- 26a. Indusium upper margin elongated **8b. *D. denticulata* var. *elata***
- b. Indusium upper margin not elongated, truncate or slightly rounded
- 8a. *D. denticulata* var. *denticulata***
- 27a. Scales nearly black, conspicuously white ciliate
- 29b. *D. trichomanoides* var. *lorrainii***
- b. Scales brown or red brown, usually less conspicuously ciliate
- 29a. *D. trichomanoides* var. *trichomanoides***

- 28a. Lamina 3-foliate, the leaflets more or less divided **22. D. repens**
 b. Lamina compound or pinnate towards base or simple, one pectinate or pinnatifid leaf 29
- 29a. Lamina simple, one pectinate or pinnatifid leaf 30
 b. Lamina compound or pinnate towards base 32
- 30a. Rhizome scales often curling backward **24. D. sessilifolia**
 b. Rhizome scales not or seldom curling backward, or appressed to rhizome... 31
- 31a. Lamina ovate and broadest towards base **22. D. repens**
 b. Lamina elongate, narrowly ovate, often narrowing towards base
20. D. pectinata
- 32a. Sori borne several on a segment 33
 b. Sori frequently single on a segment 38
- 33a. Rhizome scales not bearing multiseptate hairs 34
 b. Rhizome scales bearing multiseptate hairs at least when young 36
- 34a. Rhizome scales not or seldom curling backward **22. D. repens**
 b. Rhizome scales often curling backward 35
- 35a. Lamina pinnate towards base, scales toothed, false veins not present, indusium semicircular, 1.1–1.8 by 1.2–1.8 **24. D. sessilifolia**
 b. Lamina compound, scales with marginal setae at least in distal part, false veins present, indusium more or less triangular to rhomboid, or oblong, 0.5 mm long and broad **7. D. corniculata**
- 36a. Indusium attached at the broad base and hardly or not at the sides, semicircular or more or less triangular to rhomboid **22. D. repens**
 b. Indusium also attached along the sides, pouch-shaped, oblong 37
- 37a. Lamina pinnate with pinnatilobed to pinnatifid pinnae or bipinnate, scales without pale border, pinnae linear-triangular or narrowly ovate, longest pinnae 1.5–3 cm broad, pinnules or pinna-lobes linear oblong, longest pinnules 10–25 by 2–5.5 mm **30. D. wagneriana**
 b. Lamina tripinnate, scales with pale border from base to apex, pinnae deltoid, longest pinnae 3.5–9 cm broad, pinnules or pinna-lobes deltoid, narrowly ovate, or ovate, longest pinnules 27–70 by 12–40 mm
26b. D. solida var. pyxidata
- 38a. Lamina pinnate with pinnatilobed to pinnatifid pinnae 39
 b. Lamina bipinnate, tripinnate, quadripinnate, or entirely divided into fine linear segments without obvious rhachis 41
- 39a. Lamina narrowly ovate, elongate, often narrowing towards base
23. D. rouffaeriensis
 b. Lamina ovate or deltoid and broadest towards base 40
- 40a. Vein endings on sterile segments not reaching the margin, rhizome scales lacking marginal setae or teeth or those rare, or toothed **25. D. sessilifolioides**
 b. Vein endings on sterile segments reaching the margin, rhizome scales with marginal setae at least in distal part **22. D. repens**
- 41a. Indusium attached at the base and only part of the sides, or attached at the broad base and hardly or not at the sides, semicircular or more or less triangular to rhomboid 42
 b. Indusium also attached along the sides, pouch-shaped, oblong 44

- b. Lamina simple or imparipinnate, rhizome not white waxy, rhizome scales bearing multiseptate hairs at least when young, margin of sterile leaves distinctly crenulate to dentate at least towards apex, indusium 1.5–2.5 mm long, longer than wide 6
- 6a. Lamina simple or imparipinnate, rhizome scales not or seldom curling backward or appressed to rhizome, 5 mm long, margin of sterile leaves recurved or revolute **33. D. triphylla**
- b. Lamina imparipinnate, rhizome scales often curling backward, 6–10 mm long, margin of sterile leaves flat or nearly so **31. D. pentaphylla**
- 7a. Rhizome scales broad, ovate to oblong-subdeltoid with round to acute apex, appressed to rhizome, usually crisped, margins recurved **21. D. pulchra**
- b. Rhizome scales different 8
- 8a. Lamina 3-foliate, the leaflets more or less divided **22. D. repens**
- b. Lamina compound or pinnate towards base, or simple, one pectinate or pinnatifid leaf 9
- 9a. Lamina simple, one pectinate or pinnatifid leaf 10
- b. Lamina compound or pinnate towards base 12
- 10a. Rhizome scales often curling backward **24. D. sessilifolia**
- b. Rhizome scales not or seldom curling backward or appressed to rhizome .. 11
- 11a. Lamina of simple or pinnate leaf ovate and broadest towards base
22. D. repens
- b. Lamina of pectinate leaf narrowly ovate, elongate, often narrowing towards base **20. D. pectinata**
- 12a. Indusium reniform or semicircular, attached at the narrow, cordate base only, or attached at the base and only part of the sides, or attached at the broad base and hardly or not at the sides 13
- b. Indusium also attached along the sides, pouch-shaped 31
- 13a. Rhizome white waxy under the scales 14
- b. Rhizome not white waxy 22
- 14a. Lamina pinnate towards base 15
- b. Lamina compound 19
- 15a. Lamina pinnate with pinnatifid to pinnatilobed pinnae, narrowly ovate
23. D. rouffaeriensis
- b. Lamina ovate 16
- 16a. Sori frequently single on a segment 17
- b. Sori borne several on a segment 18
- 17a. Vein endings on sterile segments not reaching the margin, rhizome scales lacking marginal setae or teeth or those rare, or toothed **25. D. sessilifolioides**
- b. Vein endings on sterile segments reaching the margin, rhizome scales with marginal setae at least in distal part **22. D. repens**
- 18a. Rhizome scales often curling backward, scales toothed .. **24. D. sessilifolia**
- b. Rhizome scales not or seldom curling backward, with marginal setae at least in distal part **22. D. repens**
- 19a. Rhizome scales not or seldom curling backward, or appressed to rhizome .. 20
- b. Rhizome scales often curling backward 21

- 20a. Lamina pinnate with pinnatilobed to pinnatifid pinnae, bipinnate, tripinnate, or quadripinnate **22. *D. repens***
 b. Lamina entirely divided into fine linear segments without obvious rachis
19. *D. parvula*
- 21a. Lamina 16–50 by 9–25 cm pinnae linear-triangular or narrowly ovate, veins in sterile ultimate lobes pinnate, false veins present, sori borne several on a segment, indusium 0.5 mm long and mm broad **7. *D. corniculata***
 b. Lamina 2–9.5 by 1.5–4 cm, pinnae ovate, veins in sterile ultimate lobes frequently simple, false veins not present, sori frequently single on a segment, indusium 0.7–1.1 mm long and broad **3. *D. brassii***
- 22a. Lamina pinnate with pinnatilobed to pinnatifid pinnae 23
 b. Lamina bipinnate, tripinnate, or quadripinnate 24
- 23a. Rhizome scales often curling backward, brown, pinnae linear-triangular, indusium more or less triangular to rhomboid, 0.4–0.6 mm long and broad
23. *D. rouffaeriensis*
 b. Rhizome scales not or seldom curling backward, whitish or red brown, pinnae narrowly ovate, indusium semicircular, 0.7–1 by 0.8–1.2 mm
2. *D. assamica*
- 24a. Pinnae sessile **6. *D. clarkei***
 b. Pinnae petiolate, longest petiolules 0.5–35 mm long 25
- 25a. Lamina elongate, often narrowing towards base 26
 b. Lamina deltoid and broadest towards base 27
- 26a. Lamina bearing multicellular hairs, bipinnate, pinnules or pinna-lobes linear oblong, rhizome scales with pale border from base to apex, peltate, indusium attached at the broad base and hardly or not at the sides, semicircular or oblong
17. *D. membranulosa*
 b. Lamina glabrous, tripinnate, pinnules or pinna-lobes narrowly ovate, rhizome scales without pale border, basifixed with cordate base and much overlapping lobes, indusium reniform or semicircular, attached at the narrow, cordate base only **15. *D. hymenophylloides***
- 27a. False veins present, indusium oblong **8b. *D. denticulata* var. *elata***
 b. False veins not present, indusium reniform or semicircular, or more or less triangular to rhomboid 28
- 28a. Rhizome scales narrowed evenly towards the apex 29
 b. Rhizome scales distinctly acicular, or flat and nearly acicular, narrowed abruptly from a broad base 30
- 29a. Leaf rachises hairy, rhizome scales basifixed with cordate base and much overlapping lobes, ultimate leaflets linear oblong, indusium reniform or semicircular, attached at the narrow, cordate base only, wider than long, 0.5 mm long
18. *D. multidentata*
 b. Leaf axes glabrous, rhizome scales peltate, ultimate leaflets narrowly ovate, indusium attached at the base and only part of the sides, or attached at the broad base and hardly or not at the sides, semicircular, about as wide as long, 1 mm long **13. *D. griffithiana***

- 30a. Lamina bipinnate, rhizome scales red brown, flat and nearly acicular, narrowed abruptly from a broad base, lamina 16–25 cm long, pinnae deltoid or ovate, ultimate segments 4–6 mm long, veins in sterile ultimate lobes pinnate, vein endings on sterile segments reaching the margin, sori borne several on a segment, indusium more or less triangular to rhomboid, lamina generally extending into a tooth only at the outside of a sorus **27. *D. speciosa***
- b. Lamina tripinnate or quadripinnate, rhizome scales nearly black, distinctly acicular, lamina 7–14 cm long, pinnae linear-triangular, ultimate segments 1–2 mm long, veins in sterile ultimate lobes often simple, vein endings on sterile segments not reaching the margin, sori frequently single on a segment, indusium semicircular, lamina not extending into teeth beyond a sorus **11. *D. falcinella***
- 31a. Rhizome white waxy under the scales 32
- b. Rhizome not white waxy 38
- 32a. Sori borne several on a segment 33
- b. Sori frequently single on a segment 35
- 33a. Rhizome scales not bearing multiseptate hairs, often curling backward, indusium 0.5 mm long **7. *D. corniculata***
- b. Rhizome scales bearing multiseptate hairs at least when young, not or seldom curling backward or appressed to rhizome, indusium 1–1.5 mm long 34
- 34a. Lamina pinnate with pinnatifid to pinnatifid pinnae, or bipinnate, rhizome scales without pale border, pinnae linear-triangular or narrowly ovate, longest pinnae 1.5–3 cm broad, pinnules or pinna-lobes linear oblong, longest pinnules 10–25 by 2–5.5 mm **30. *D. wagneriana***
- b. Lamina tripinnate, rhizome scales with pale border from base to apex, pinnae deltoid, longest pinnae 3.5–9 cm broad, pinnules or pinna-lobes deltoid, narrowly ovate, or ovate, longest pinnules 27–70 by 12–40 mm
- 26b. *D. solida* var. *pyxidata***
- 35a. Veins in sterile ultimate lobes pinnate, rhizome scales brown, false veins present **12. *D. graeffei***
- b. Veins in sterile ultimate lobes frequently simple or forked, rhizome scales red brown, false veins not present 36
- 36a. Lamina bearing multicellular hairs, indusium upper margin elongated, free
- 4. *D. brevipes***
- b. Lamina glabrous, indusium upper margin not elongated, truncate or slightly rounded 37
- 37a. Lamina bipinnate or tripinnate, rhizome scales without pale border, pinnae narrowly ovate or ovate, pinnules linear oblong, veins in sterile ultimate lobes forked, vein endings on sterile segments reaching the margin, indusium longer than wide, 1.3–1.5 by 0.5 mm, lamina generally extending into a tooth at both sides of a sorus **16. *D. leptocarpa***
- b. Lamina quadripinnate, rhizome scales with pale border from base to apex, pinnae rhomboid, pinnules ovate, veins in sterile ultimate lobes frequently simple, vein endings on sterile segments not reaching the margin, indusium about as wide as long, 1 mm long and broad, lamina generally extending into a tooth only at the outside of a sorus **5. *D. canariensis***

- 38a. Sori frequently single on a segment 39
 - b. Sori borne several on a segment 43
- 39a. Rhizome scales bearing multiseptate hairs at least when young, pinnae rhomboid, linear-triangular, or narrowly ovate 40
 - b. Rhizome scales not bearing multiseptate hairs, pinnae deltoid or ovate. 41
- 40a. Veins in sterile ultimate lobes pinnate, pinnae rhomboid, longest pinnae 5–10 cm long, pinnules ovate, margins of the lamina of each leaflet thickened and decurrent on the edge of the grooved rhachis **28. *D. tasmani***
 - b. Veins in sterile ultimate lobes frequently simple, pinnae linear-triangular or narrowly ovate, longest pinnae 11–30 cm long, pinnules or pinna-lobes narrowly ovate, margins of the lamina of each leaflet not thickened
26c. *D. solida* var. *fejeensis*
- 41a. Rhizome scales narrowed evenly towards the apex, scales basifixed with cordate base and much overlapping lobes, stipes 30–40 cm long, lamina strongly dimorphous, ultimate leaflets lobed halfway towards midrib or only shallowly lobed, veins in sterile ultimate lobes pinnate, vein endings on sterile segments reaching the margin, indusium semicircular, wider than long, 1.5–2.5 mm broad **9b. *D. divaricata* var. *dimorpha***
 - b. Rhizome scales distinctly acicular or flat and nearly acicular, narrowed abruptly from a broad base, or above the much broader base evenly narrowed towards apex, peltate, stipes 4.5–20 cm long, lamina not or slightly dimorphous, ultimate leaflets lobed almost to the midrib, veins in sterile ultimate lobes frequently simple, or forked, vein endings on sterile segments not reaching the margin, indusium oblong, longer than wide, 0.5–1 mm broad 42
- 42a. Rhizome scales nearly black, obviously white-ciliate
29b. *D. trichomanoides* var. *lorrainii*
 - b. Rhizome scales brown, or red brown, usually less obviously ciliate
29a. *D. trichomanoides* var. *trichomanoides*
- 43a. False veins present 44
 - b. False veins not present 45
- 44a. Indusium upper margin elongated, free, separated from or even with lamina margin **8b. *D. denticulata* var. *elata***
 - b. Indusium upper margin not elongated, truncate or slightly rounded
8a. *D. denticulata* var. *denticulata*
- 45a. Indusium upper margin elongated, free, separated from or even with lamina margin, or protruding beyond lamina margin **10. *D. embolostegia***
 - b. Indusium upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin 46
- 46a. Rhizome scales bearing multiseptate hairs at least when young, with pale border from base to apex, peltate, lamina generally extending into a tooth only at the outside of a sorus or not extending into teeth beyond a sorus
26a. *D. solida* var. *solida*
 - b. Rhizome scales not bearing multiseptate hairs, without pale border, basifixed with cordate base and much overlapping lobes, lamina generally extending into a tooth at both sides of a sorus **9a. *D. divaricata* var. *divaricata***

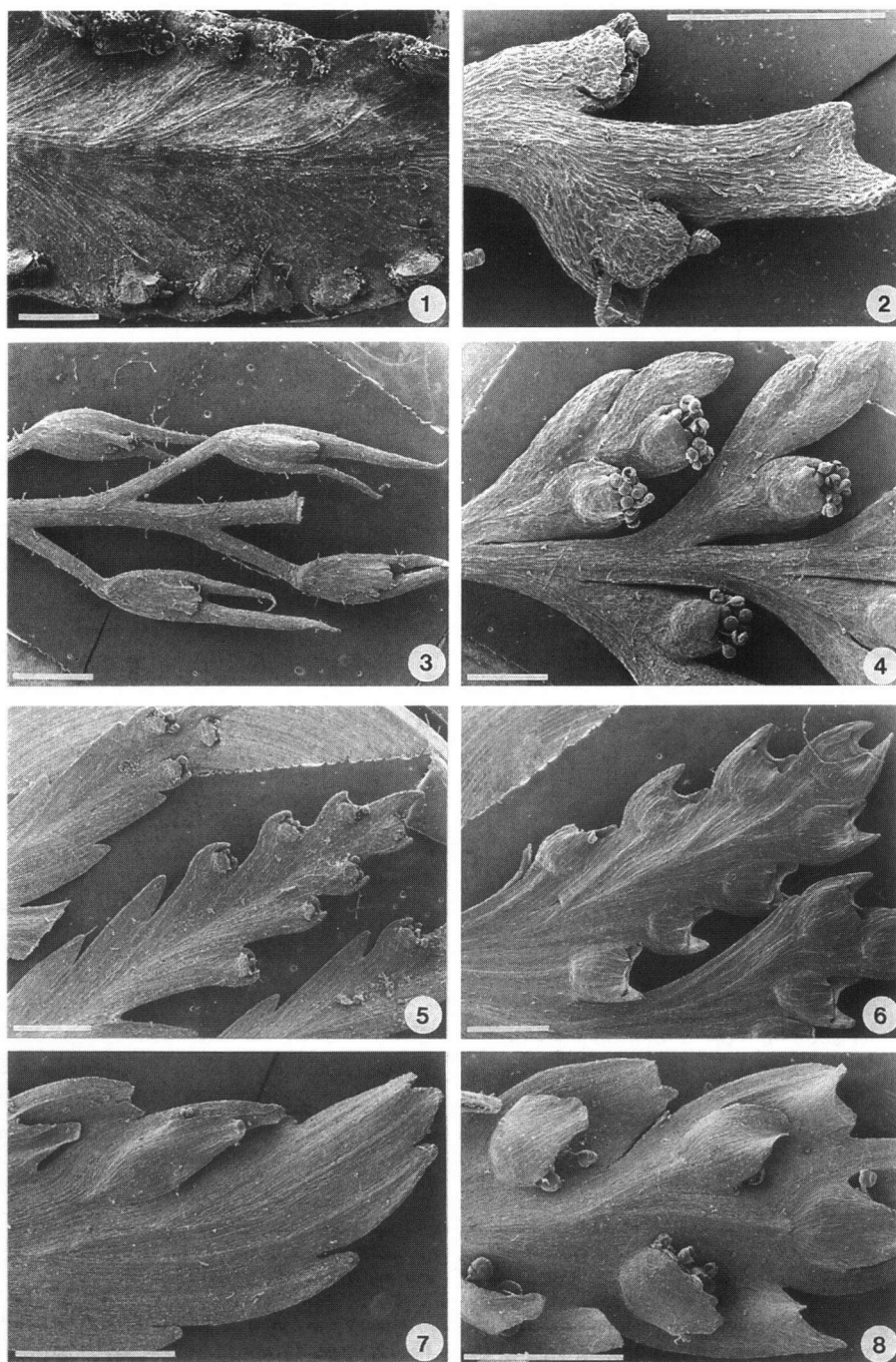


Plate 1 — For legends, see page 172.

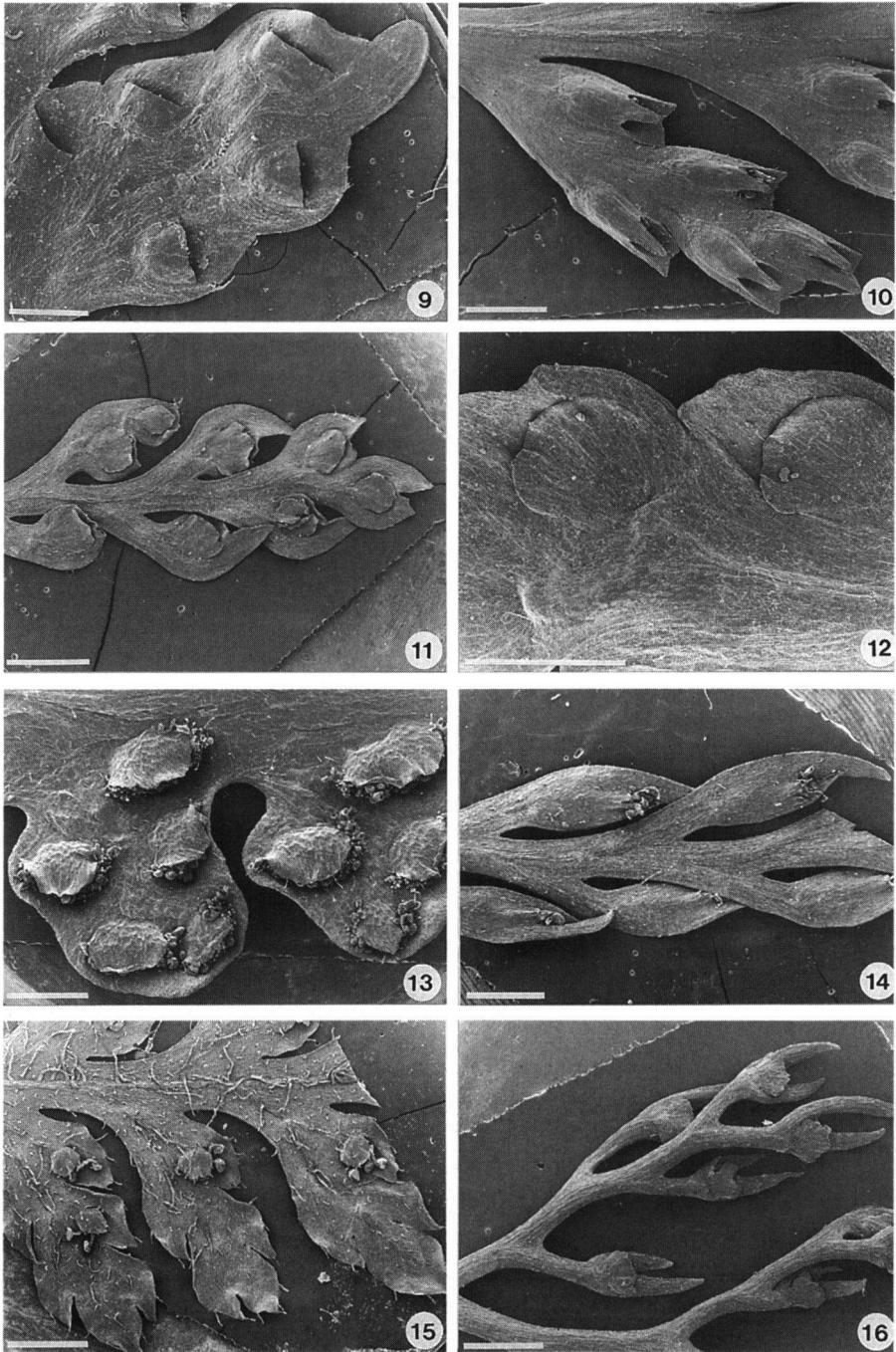


Plate 2 — For legends, see page 172.

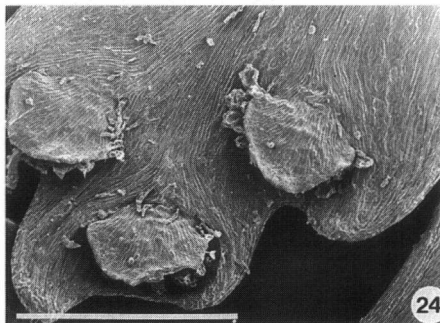
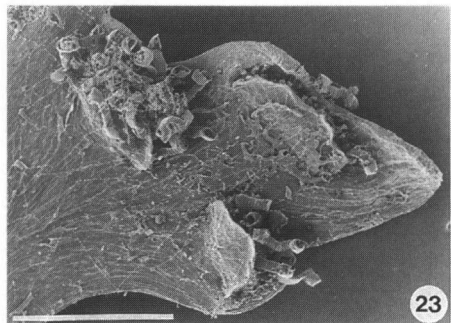
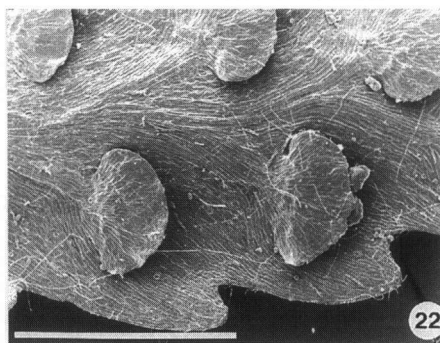
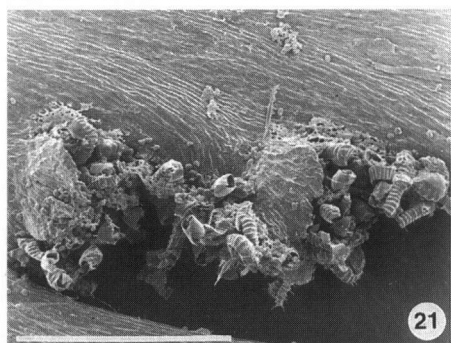
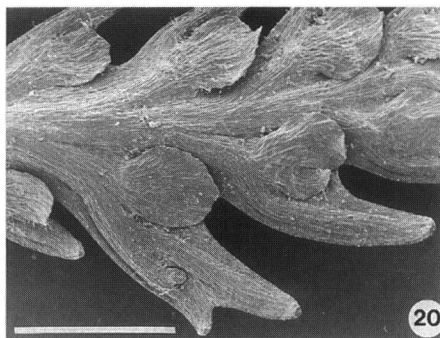
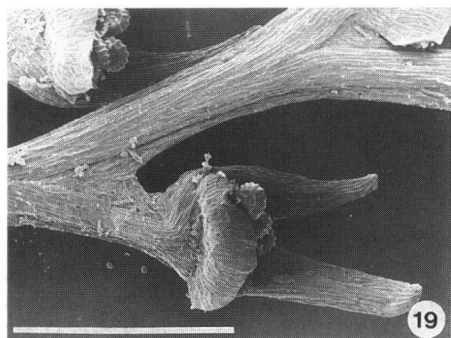
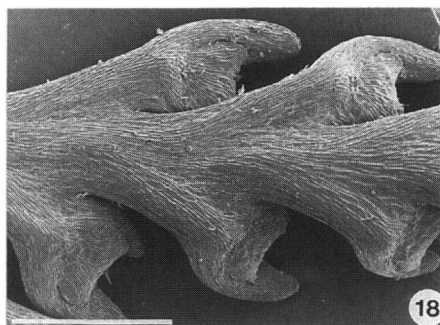
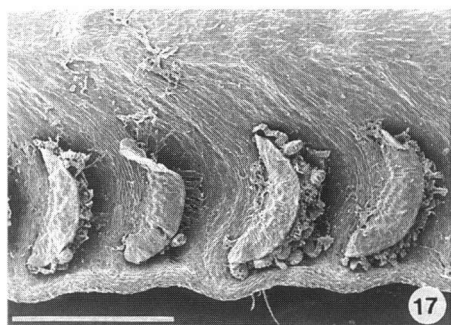


Plate 3 — For legends, see page 172.

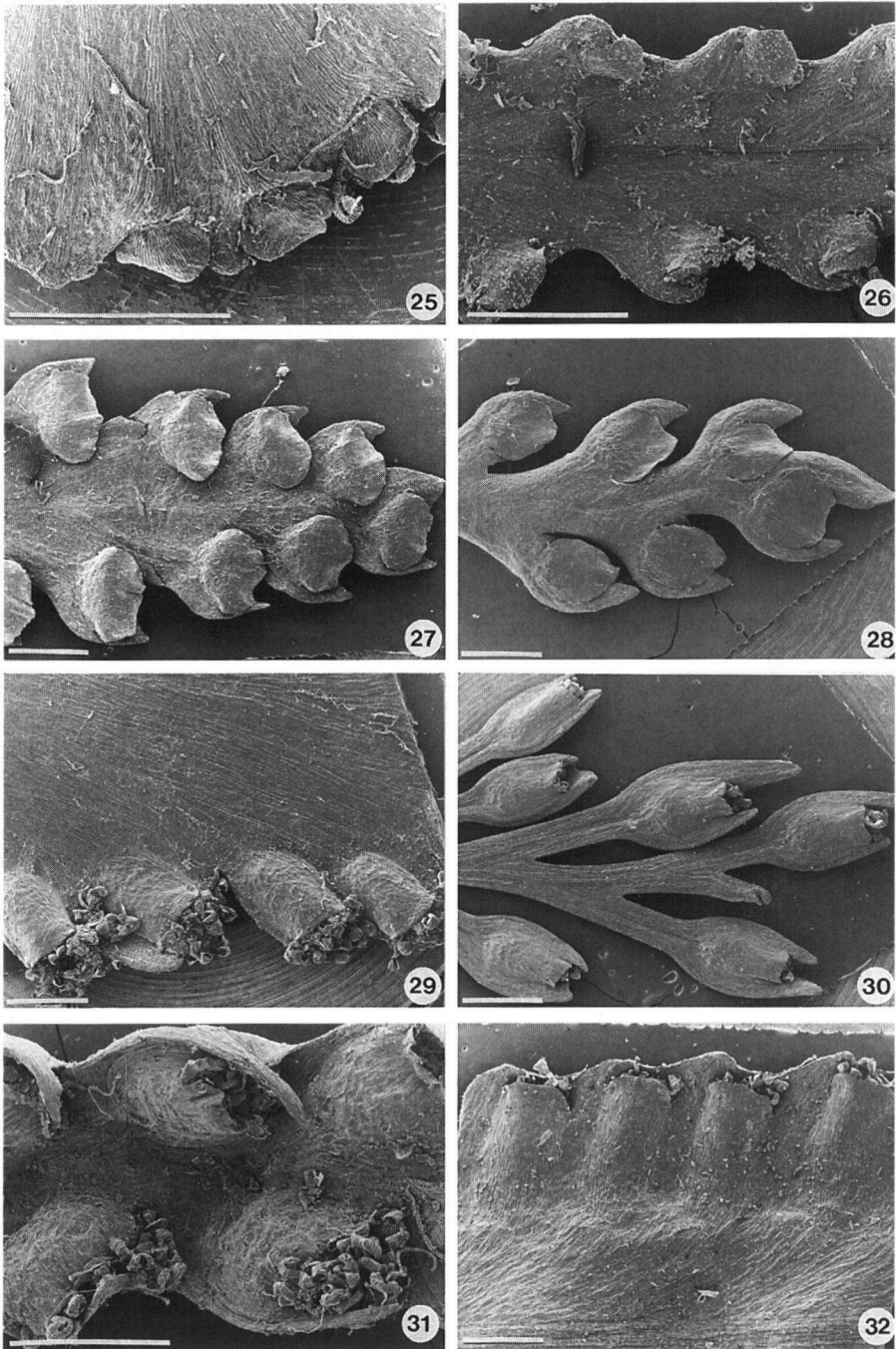


Plate 4 — For legends, see page 172.

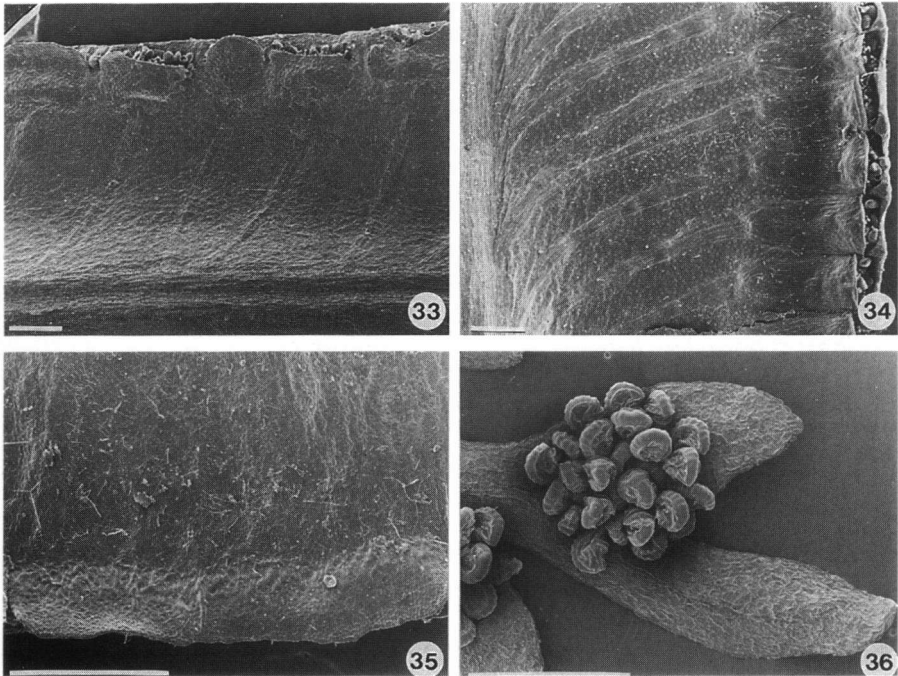


Plate 5. SEM photographs of indusia; scale bar = 1 mm. — 33. *Davallia seramensis* (Kato C-1276). — 34. *D. triphylla* (de Wilde c.s. 20708). — 35. *D. undulata* (Pleyte 363). — 36. *Gymnogrammitis dareaeformis* (Smitinand 1074).

Legends to Plates 1–4:

Plate 1. SEM photographs of indusia; scale bar = 1 mm. — 1. *Davallia angustata* (van Balgooy 5378). — 2. *D. brassii* (Brass 9097). — 3. *D. brevipes* (Hennipman 5580). — 4. *D. canariensis* (de Joncheere CAN 18a). — 5. *D. corniculata* (Iwatsuki T-8383). — 6. *D. denticulata* var. *denticulata* (Clemens 21459). — 7. *D. denticulata* var. *elata* (Kato C-4182). — 8. *Idem* (Nooteboom 5351).

Plate 2. SEM photographs of indusia; scale bar = 1 mm. — 9. *Davallia divaricata* var. *divaricata* (Nooteboom 1221). — 10 *D. embolostegia* (Nooteboom 2246). — 11. *D. falcinella* (Elmer 14013). — 12. *D. griffithiana* (Griffith 232). — 13. *D. heterophylla* (van Niel 3429). — 14. *D. leptocarpa* (MacGillivray 56). — 15. *D. membranulosa* (Murata T-16937). — 16. *D. parvula* (Anderson 10012).

Plates 3 & 4. SEM photographs of indusia; scale bar = 1 mm. — 17. *D. pectinata* (Braithwaite 4571). — 18–25. *D. repens* (resp. Brass 27402, LAE 58472, Main & Aden 510, Price & Hernaez 713, Brass 7166, S 28663, Nooteboom 5542, Brooke 9064). — 26. *D. rouffaeriensis* (Docters van Leeuwen 10248). — 27. *D. sessilifolia* (de Vogel 7166). — 28. *D. sessilifolioides* (Kato C-5336). — 29. *D. solida* var. *solida* (Hennipman 6147). — 30. *D. trichomanoides* var. *trichomanoides* (Schmutz 18). — 31. *D. wagneriana* (Kjellberg 3658). — 32. *D. pentaphylla* (Kato C-1655).

Section *Davallia*

Davallia sect. *Davallia* — *Wibelia* Bernh. — *Humata* Cav. — *Pachypleuria* K. Presl — *Stenolobus* K. Presl — *Parestia* K. Presl — *Pteroneuron* Fée — *Araiostegia* Copel. — *Trogostolon* Copel. — *Paradavallodes* Ching — *Davallia* sect. *Cordisquama* Kato.

For a more detailed synonymy, see under the genus.

1. *Davallia angustata* Wall. ex Hook. & Grev.

Davallia angustata Wall. [Cat. (1829) nr. 242, nomen] ex Hook. & Grev., Icon. Filic. (1831) t. 231. — *Davallia angustifolia* [sic] Roxb., Fl. Ind. 4 Crypt. (Calc. J. Nat. Hist. 4) (1844) 51; Hook., Sp. Fil. (1845) 152; Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286. — *Humata angustata* J. Sm., J. Bot. 3 (1841) 415, 416; Bedd., Ferns Brit. India (1867) t. 237; Hook., Syn. Fil. (1868) 88; Bedd., Handb. Ferns Brit. India (1883) 47; Copel., Publ. Bur. Sci. Gov. Lab. Philipp. 28 (1905) 50; Fern Fl. Philipp. (1958) 179; Holttum, Revis. Fl. Malaya 2, sec. ed. (1966) 367. — *Pachypleuria angustata* K. Presl, Epim. Bot. (1851) 98. — Type: *Wallich* 242 (K; iso BR, P), Prince of Wales I.

Humata microsora Copel., Philipp. J. Sci., Bot. 7 (1912) 55, t. 4; Fern Fl. Philipp. (1958) 179. — Type: *Weber* 1146 (A, K, P), Philippines, Mindanao, Butuan Subprov.

Humata attenuata Alderw., Bull. Jard. Bot. Buitenzorg III, 5 (1922) 205. — Type: *Bunnemeijer* 5829 (BO; iso L), Sumatra, Riouw Arch., P. Tuju.

Humata mutata Alderw., Bull. Jard. Bot. Buitenzorg III, 5 (1922) 206. — Type: *Bunnemeijer* 6900 (BO; iso L), Sumatra, Lingga Arch., P. Lingga, G. Tanda.

Humata angustata J. Sm. var. *hastata* C. Chr., Gard. Bull. Str. Settl. 4 (1929) 398. — Type: *Henderson* 18256 (BM, SING), Malay Peninsula, Pahang, G. Kajang, Pulau Tioman.

Humata carolinensis Hosok., Trans. Nat. Hist. Soc. Taiwan 26 (1936) 119. — Type: *Hosokawa* 6882 (Herb. Taihoku Imp. Univ., n.v.), Carolines, Palau, Babeldaob.

Rhizome without the scales 1–2.5 mm diam., usually white waxy under the scales. Scales red brown to nearly black, without pale border, narrowed evenly towards the apex, not or seldom curling backward, not bearing multiseptate hairs, toothed, peltate, 6–8 by 1 mm. Stipes pale to dark brown, adaxially grooved, 1–7 cm long, glabrous or with few scales. *Lamina* simple, one entire to pinnatilobed leaf, linear, glabrous, 5–24 by 6–20 cm, not or slightly dimorphous. Margins distinctly crenulate to dentate at least towards apex. False veins absent. *Sori* separate at the forking point of veins. Indusium attached at the broad base and hardly or not at the sides, semicircular, about as wide as long, 0.5–0.8 by 0.6–0.8 mm.

Distribution — Continental Asia: S Cambodia (1 coll.); S Thailand (3 coll.); Malesia: Sumatra (Bangka, Batu I., Bengkulu, Djambi, E Coast, Riouw, Lingga Arch., Indragiri, P. Bientang; 25 coll.); Malay Peninsula (Johore, Kedah, Kelantan, Negri Sembilan, Pahang, Penang, Perak, Selangor, Trengganu; 22 coll.); Singapore (2 coll.); Borneo: Sarawak (Bako Nat. Park, Bintulu, Mt Dulit, Simangan; 3 coll.), Brunei (3 coll.), Sabah (Sandakan, 1 coll.), Kalimantan Barat (Bt Tilung, G. Semedung, Sanggau, G. Palung; 4 coll.), Kalimantan Tengah (Sampit, 2 coll.), Kalimantan Selatan (G. Sakoembang, 1 coll.), Kalimantan Timur (G. Batukenye, G. Beratus, Sgei Wain N of Balikpapan, Samarinda; 5 coll.); Philippines (Palawan, Paragua, Mindanao; 4 coll.); SE Sulawesi (1 coll.), S Sulawesi (2 coll.); Pacific: Palau Is. (1 coll.).

Habitat & Ecology — Epiphytic, often low on tree bole, or epilithic; altitude from sea-level up to 1300 m.

2. *Davallia assamica* (Bedd.) Baker in Hook. & Baker

Davallia assamica Baker in Hook. & Baker, Syn. Fil. ed. 1 (1868) 452; Ibid. ed. 2 (1874) 467; Clarke, Rev. Ferns N. India (1880) 443. — *Acrophorus assamica* Bedd., Ferns Brit. India (1865) t. 94. — *Leucostegia assamica* J. Sm., Hist. Fil. (1875) 84; Bedd., Handb. Ferns Brit. India (1883) 51. — *Humata assamica* C. Chr., Contr. U.S. Natl. Herb. 26 (1931) 293; Basu & Giri, J. Econ. Tax. Bot. 15 (1991) 118, t. 1, f. 2p-t. — Type: Thomson, Bedd. t. 94, Assam. (The collection cited by Beddome is made by Thomson and annotated by T. Moore: "New species near *membranulosa*"; I did not find the specimen.)

Rhizome without the scales 3–5.3 mm diam., not white waxy. *Scales* whitish or red brown, without pale border, narrowed evenly towards the apex, not or seldom curling backward, not bearing multiseptate hairs, toothed, peltate, 8–10 by 1.8–2.5 mm. Stipes adaxially grooved, 4–7 cm long, glabrous or with few scales. *Lamina* narrowly ovate, pinnate with pinnatilobed to pinnatifid pinnae towards base and in the middle part, or sometimes bipinnate, elongate, glabrous, 10–27 by 3.5–12 cm, not or slightly dimorphous. Longest petiolules 1 mm long. Pinnae narrowly ovate. Longest pinnae 3.5–6 by 1–2 cm. Pinna-lobes of at least the larger pinnae anadromous, linear oblong, longest 7–15 by 3–4 mm. Upper ridge at the junction of the costa and pinna-rhachis not swollen. Leaf axes glabrous. Margins of the lamina of each leaflet thickened and decurrent on the edge of the grooved rhachis (in fertile leaves). Veins in sterile ultimate lobes pinnate, not reaching the margin. False veins not present. *Sori* separate, borne several or frequently single on a segment, at the forking point of veins. Indusium attached at the broad base and hardly or not at the sides, semicircular, wider than long or about as wide as long, 0.7–1 by 0.8–1.2 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin. Lamina generally extending into a tooth at both sides or only at the outside of a sorus.

Distribution – Continental Asia: India (Manipur, Naga Hills, Bhutan; 10 coll.); Burma (1 coll.); S Tibet (5 coll.), China: Yunnan (14 coll.).

Habitat & Ecology – Altitude 900–2100 m.

3. *Davallia brassii* (Copel.) Noot., *comb. nov.*

Humata brassii Copel., Philipp. J. Sci. 73 (1940) 351, t. 5. — Lectotype (here chosen): Brass & Meijer Drees 9678 (L; iso BM, K), New Guinea, Mt Wilhelmia.

Rhizome without the scales 1–1.9 mm diam., white waxy under the scales. *Scales* red brown, without pale border, narrowed evenly towards the apex, often curling backward, not bearing multiseptate hairs, with marginal setae at least in distal part, peltate, 4–6 by 1 mm. Stipes usually dark brown, adaxially grooved, 1–17 cm long, glabrous or with few scales. *Lamina* compound, tripinnate towards base and in the middle part, deltoid and broadest towards base, glabrous, 2–15 by 1.5–12 cm, not or slightly dimorphous (or rarely dimorphous). Longest petiolules 1–5 mm long. Pinnae ovate. Longest pinnae 1–7 by 0.6–3 cm. Pinnules of at least the larger pinnae anadromous, rhomboid or linear oblong. Longest pinnules 4–45 by 3–15 mm. Ultimate leaflets linear oblong or rhomboid, lobed almost to the midrib. Ultimate segments or lobes obtuse or acute without a tooth, 1–3 by 0.5–0.8 mm. Upper ridge at the

junction of the costa and pinna-rhachis not swollen. Leaf axes glabrous. Veins in sterile ultimate lobes frequently simple, reaching the margin. False veins absent. *Sori* separate, frequently single on a segment, at the forking point of veins. Indusium attached at the broad base and hardly or not at the sides, more or less triangular to rhomboid, about as wide as long, 1 by 1 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin. Lamina generally extending into a tooth at both sides or only at the outside of a sorus.

Distribution – Only in Malesia: West New Guinea (Lake Habbema, Mt Trikora, Ugumba; 9 coll.), Papua New Guinea (West Sepik, Mt Capella; Northern Prov., Mt Kenive, Mt Kaindi; 3 coll.).

Habitat & Ecology – Epiphyte; altitude (1750–)3000–3400 m.

Note – There is not always a clear distinction between *D. brassii* and *D. repens*. The scales are different, curling backward and without multicellular hairs in *D. brassii*, but sometimes, at lower altitudes, collections with the *brassii*-type of scales are found with multicellular hairs. Possibly they are from hybrid origin.

4. *Davallia brevipes* Copel.

Davallia brevipes Copel., Philipp. J. Sci., Suppl. 1 (1906) 147, t. 2; Fern Fl. Philipp. (1958) 172; Hovenkamp & De Joncheere, Blumea 33 (1988) 408; Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 226. — Type: *Copeland 1662* (BM, P), Philippines, Mindanao, San Ramon. *Davallia pullei* Rosenst., Nova Guinea 8 (1912) 719. — Type: *von Römer (Pulle) 214* (BO), New Guinea.

Rhizome without the scales 2–3.8 mm diam., white waxy under the scales. *Scales* red brown, without pale border, narrowed evenly towards the apex, not or seldom curling backward, bearing multiseptate hairs at least when young, peltate, 7–9 by 1.5–2.5 mm. Stipes pale or dark brown, adaxially grooved, 2–13 cm long, bearing hairs and/or scales when young, or glabrous or with few scales. *Lamina* compound, tripinnate towards base and in the middle part, deltoid and broadest towards base, bearing multicellular hairs, 8–23 by 5–14 cm, not or slightly dimorphous. Longest petiolules 1–3 mm long. Pinnae deltoid. Longest pinnae 2.5–8 by 1.5–4.5 cm. Pinnules of at least the larger pinnae anadromous, linear oblong. Longest pinnules 10–30 by 3–10 mm. Ultimate leaflets linear oblong, lobed almost to the midrib. Ultimate segments or lobes acute and usually ending in a tooth, 0.5–4 by 0.3–1 mm. Upper ridge at the junction of the costa and pinna-rhachis with a swollen lip. Leaf axes, at least rhachises, hairy. Veins in sterile ultimate lobes simple or forked, reaching the margin. False veins absent. *Sori* separate, frequently single on a segment, at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide, 1–1.5 by 0.5 mm, upper margin elongated, free, separated from or even with lamina margin. Lamina generally extending into a tooth at both sides of a sorus.

Distribution – Malesia: Philippines (Mindanao; 3 coll.); Central Sulawesi (Mt Wawonseru, Sopo Valley; 4 coll.); Moluccas (Ceram, 1 coll.); West New Guinea (Albatros bivak, Cyclops Mts; 3 coll.); Papua New Guinea (E and W Highlands, Fly River, and Morobe Prov., New Ireland, Bougainville; 6 coll.); Pacific: Samoa (Upolu, 1 coll.).

Habitat & Ecology – Epiphytic, often low on trees, or epilithic, sometimes in exposed places; altitude 80–1100 m.

5. *Davallia canariensis* (L.) J. Sm.

Davallia canariensis J. Sm., Mém. Accad. Sci. Turin 5 (1793) 414, t. 9, f. 6; Hoshiz., Bailey 21 (1981) 7, t. 2. — *Trichomanes canariensis* L., Sp. Pl. 2 (1753) 1099. — Type: *Loeffling* (Herb. LINN), Canary Islands.

Davallia bornmülleri Gand., Bull. Soc. Bot. France 60 (1913) 28. — Type: *Bornmüller 1413b* (P), Madeira.

Rhizome without the scales 3.9–15 mm diam., white waxy under the scales. *Scales* red brown, with pale border from base to apex, narrowed evenly towards the apex, not or seldom curling backward, usually bearing multiseptate hairs at least when young, with marginal setae at least in distal part or toothed, peltate, 8–10 by 2–2.5 mm. Stipes pale to dark brown, adaxially grooved, 9–20 cm long, glabrous or with few scales. *Lamina* compound, quadripinnate towards base and in the middle part, deltoid and broadest towards base, glabrous, 12–40 by 10–40 cm, not or slightly dimorphous. Longest petiolules 6–25 mm long. Pinnae rhomboid, longest pinnae 9–20 by 4–10 cm. Pinnules of at least the larger pinnae anadromous, ovate, longest pinnules 30–80 by 10–40 mm. Ultimate leaflets linear oblong, lobed almost to the midrib. Ultimate segments or lobes obtuse or acute without a tooth, 1.5–3 by 1–1.5 mm. Upper ridge at the junction of the costa and pinna-rhachis with a swollen lip. Leaf axes glabrous. Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes frequently simple, not reaching the margin. False veins absent. *Sori* separate, frequently single on a segment, at the forking point of the veins. Indusium also attached along the sides, pouch-shaped, oblong, about as wide as long, 1 by 1 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin. Lamina generally extending into a tooth only at the outside of a sorus.

Distribution – Portugal, Spain, Morocco (Tangier), Madeira, Canary Islands, Cape Verde Islands.

Habitat & Ecology – Epiphytic or epilithic, also on walls; altitude 100–1000 m.

6. *Davallia clarkei* Baker

Davallia clarkei Baker, Syn. Fil. (1874) 91. — [*Acrophorus hookeri* T. Moore, Index Fil. (1857) 2, nomen.] — *Leucostegia hookeri* Bedd., Handb. Ferns Brit. India (1883) 32. — *Humata hookeri* Diels in Engl. & Prantl, Nat. Pflanzenfam. 1, 4 (1899) 209. — *Araiostegia clarkei* Copel., Philipp. J. Sci. 34 (1927) 241; Noot., Blumea 37 (1992) 170. — *Leucostegia clarkei* C. Chr., Contr. U.S. Natl. Herb. 26 (1931) 294. — *Araiostegia hookeri* Ching, Fl. Reip. Pop. Sin. 2 (1959) 291. — Type: *Hooker f. & Thomson 315* (BM; iso K), India, Sirmur.

Davallia perdurans Christ, Bull. Herb. Boissier 6 (1898) 970. — *Humata perdurans* Hieron., Hedwigia 62 (1920) 12. — *Leucostegia perdurans* C. Chr., Contr. U.S. Natl. Herb. 26 (1931) 294. — *Araiostegia perdurans* Copel., Univ. Calif. Publ. Bot. 12 (1931) 397. — Type: *Henry 10086* (BAS; iso BM, A, K), China, Yunnan.

Davallia parvipinnula Hayata, Mat. Fl. Formosa (1911) 431. — *Leucostegia parvipinnula* Hayata, Icon. Pl. Formos. 4, 4 (1914) 205, f. 139. — *Araiostegia parvipinnula* Ching, Fl. Reip. Pop. Sin. 2 (1959) 292. — Type: *Kawakami & Mori 1823* (TT), in monte Morrison.

Davallia subalpina Hayata, Mat. Fl. Formosa (1911) 432. — Type: Nakahara, Nov. 1906 (TI), Formosa, Arisan.

Davallia clarkei Baker var. *faberiana* C. Chr., Acta Horti Gothob. 1 (1924) 73. — *Leucostegia clarkei* C. Chr. var. *faberiana* C. Chr., Contr. U.S. Natl. Herb. 26 (1931) 194. — *Leucostegia faberiana* Ching in C. Chr., Index Filic. Suppl. 3 (1934) 120. — *Araiostegia faberiana* Ching, Fl. Reip. Pop. Sin. 2 (1959) 293; Tagawa & Iwatsuki, Acta Phytotax. Geobot. 24 (1970) 180. — Type: *Faber 1089* (W; iso K, P), China, Sichuan, Omei Summit.

Araiostegia parva Copel., Univ. Calif. Publ. Bot. 12 (1931) 399. — *Leucostegia parva* C. Chr., Index Filic. Suppl. 3 (1934) 121. — Type: *Hooker* (UC), Sikkim.

Rhizome without the scales 5 mm diam., not white waxy. *Scales* brown, without pale border, narrowed evenly towards the apex, not bearing multiseptate hairs, lacking marginal setae or teeth, or those rare, or toothed, basifixed with cordate base and much overlapping lobes, 7–10 mm long. Stipes pale, adaxially grooved, 7–35 cm long, glabrous or with few scales. *Lamina* compound, tripinnate, or quadripinnate, deltoid and broadest towards base, glabrous, 10–50 by 6–50 cm, not or slightly dimorphous. Pinnae deltoid or linear-triangular. Longest pinnae 2–30 by 1.2–18 cm. Both lowest pinnules of at least basal pinnae inserted on pinna base, other pinnules anadromous (sometimes only one pinnule), deltoid or narrowly ovate. Longest pinnules 6–130 by 2–50 mm. Ultimate leaflets linear oblong, lobed almost to the midrib. Ultimate segments or lobes obtuse or acute without a tooth, 1–4 by 0.2–1 mm. Leaf axes glabrous. Veins in sterile ultimate lobes frequently simple, not reaching the margin. False veins not present. *Sori* separate, frequently single on a segment, at the forking point of veins. Indusium reniform or semicircular, attached at the narrow, cordate base only, or attached at the broad base and hardly or not at the sides, wider than long or about as wide as long, 0.3–1.2 by 0.4–1.5 mm.

Distribution – NW India (2 coll.), Bhutan (4 coll.), Nepal (6 coll.), Burma (1 coll.), N Thailand (Doi Inthanon, Chiang Rai; 6 coll.), Tibet (c. 20 coll.); China (Yunnan), Hong Kong, and Taiwan (many coll.).

Habitat & Ecology – Epiphytic or epilithic in evergreen forest, sometimes in open places; altitude 1200–4000 m.

7. *Davallia corniculata* T. Moore

Davallia corniculata T. Moore, Index Fil. (1861) 292; Holttum, Revis. Fl. Malaya 2, sec. ed. (1966) 359. — Type: *Lobb 220* (K; iso BM, L), Java.

Humata squarrosa Alderw., Bull. Jard. Bot. Buitenzorg III, 2 (1920) 156. — Type: *Brooks 460 S* (BM), Sumatra, Bengkulu, Seblat River.

Davallia epiphylla auct. non Spreng.: Blume, Enum. Pl. Javae (1828) 235; Hook., Syn. Fil. (1868) 96; Bedd., Ferns Brit. India, Suppl. (1876) t. 350; Handb. Ferns Brit. India (1883) 60; Copel., Publ. Bur. Sci. Gov. Lab. Philipp. 28 (1905) 53. The original collection seen by Blume is L sh 908.332-500.

Rhizome without the scales 3–4 mm diam., white waxy under the scales. *Scales* red brown, without pale border, narrowed evenly towards the apex, often curling backward, not bearing multiseptate hairs, with marginal setae at least in distal part, peltate, 4–5 by 0.5–1 mm. Stipes dark brown, adaxially grooved, 9–30 cm long, glabrous or with few scales. *Lamina* compound, bipinnate or tripinnate towards base and in the middle part, deltoid and broadest towards base, glabrous, 16–50 by 9–25 cm,

not or slightly dimorphous. Longest petiolules 2–4 mm long. Pinnæ narrowly ovate. Longest pinnæ 5–19 by 2–4.5 cm. Pinnules of at least the larger pinnæ anadromous, linear oblong or narrowly ovate. Longest pinnules 12–25 by 3–10 mm. Ultimate leaflets linear oblong, lobed almost to the midrib, or only shallowly lobed. Ultimate segments or lobes obtuse or acute without a tooth, or acute and usually ending in a tooth, 0.5–7 by 1–2 mm. Upper ridge at the junction of the costa and pinnarhachis not swollen. Leaf axes glabrous. Margins of the lamina of each leaflet thickened and decurrent on the edge of the grooved rhachis. Veins in sterile ultimate lobes pinnate, reaching the margin. False veins present. *Sori* separate, borne several on a segment, at the forking point of veins. Indusium attached at the base and only part of the sides, or also attached along the sides, pouch-shaped, more or less triangular to rhomboid or oblong, about as wide as long, c. 0.5 by 0.5 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin. Lamina generally extending into a tooth at both sides or only at the outside of a sorus.

Distribution – S Thailand (3 coll.); Malesia: Sumatra (Aceh, Bengkulu, East Coast, N Sibajak, Tapanuli; 5 coll.), Malay Peninsula (Pahang, Penang, Perak; 8 coll.), W Java (many coll.); Borneo: Sabah (Kinabalu, 1 coll.).

Habitat & Ecology – Epiphytic or epilithic, sometimes in rather dry places; altitude 300–1800 m.

8. *Davallia denticulata* (Burm. f.) Mett. ex Kuhn

a. var. *denticulata*

Davallia denticulata Mett. ex Kuhn, Filic. Decken. (1867) 27; Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286; Luerssen, Fil. Graeff. (1871) 215, non Mett.; Copel., Fern Fl. Philipp. (1958) 174; Holttum, Revis. Fl. Malaya 2, sec. ed. (1966) 359; Hoshiz., Bailey 21 (1981) 10, t. 3. — *Adiantum denticulatum* [Pluk., Phytogr. 3 (1692) 151, t. 180, f. 4;] Burm. f., Fl. Indica (1768) 236; Houtt., Nat. Hist. (1783) 254, t. 100, f. 2. — *Trichomanes denticulatum* Houtt., Nat. Hist. (1783) 254, t. 100, f. 2.

Davallia elegans Hedw., Fil. Gen. Sp. (1801); Sw., J. Bot. (Schrader) 1800 (1801) 87; Syn. Fil. (1806) 132, 347; Willd., Spec. Pl. 5 (1810) 471; Spreng., Syst. Veg. 4 (1827) 119; Blume, Enum. Pl. Javae (1828) 235; J. Sm., J. Bot. 3 (1841) 417; Hook., Sp. Fil. (1845) 164; Brack., U. S. Expl. Exped., Filic. 16 (1854) 247; Mett., Fil. Hort. Bot. Lips. (1856) 101, t. 27, f. 19, 20; Bedd., Ferns S. India (1863) t. 18; Handb. Ferns Brit. India (1883) 59; Christ, Verh. Naturf. Ges. Basel 2 (1897) 8; Copel., Publ. Bur. Sci. Gov. Lab. Philipp. 28 (1905) 53. — *Trichomanes elegans* Poir., Leçons Fl. (1820) 79. — *Humata elegans* Desv., Prod. Fam. Foug. (1827) 324. — *Parestia elegans* K. Presl, Epim. Bot. (1851) 99. — Type: *Pryon* (n.v.), Java.

Davallia bidentata Schkuhr, 24. Kl. Linn. Pfl. Syst. 1 (1804) t. 127; Deutschl. Krypt. Gew. 1 (1809) 119, t. 127. — *Davallia elegans* Hedw. var. *bidentata* Hook., Sp. Fil. (1845) 165. — Type: Schkuhr Fil. t. 127.

Davallia patens Sw., Syn. Fil. (1806) 132, 348. — *Humata patens* Desv., Prod. Fam. Foug. (1827) 325. — Type: Rottler (n.v.).

Trichomanes chaerophylloides Poir., Encycl. 8 (1808) 80. — *Davallia chaerophylloides* Steud., Nomencl. Bot. 2 (1824) 146. — *Humata chaerophylloides* Desv., Prod. Fam. Foug. (1827) 325. — Type: Herb. DC. (n.v.).

Davallia nitidula Kunze, Linnaea 10 (1836) 545. — Type: Drège (iso BM, K, L, P), South Africa.

Trichomanes lucidum Roxb., Calcutta J. Nat. Hist. 4 (1844) 519. — Type: Wallich 253 (BR, n.v.; iso K), Penang.

- Davallia mauritiana* Hook., Sp. Fil. 1 (1845) 164, t. 55B. — *Stenolobus mauritanus* K. Presl, Epim. Bot. (1851) 99. — Syntypes: *Carmichael*, *Bojer* (K), Mauritius.
- Davallia elegans* Hedw. var. *pulchra* Hook., Sp. Fil. (1845) 165. — Lectotype (here chosen): *Lobb* (K), Singapore.
- Davallia elegans* Hedw. var. *coniifolia* Hook., Sp. Fil. (1845) 165. — [*Davallia coniifolia* Wall., Cat. (1829) nr. 252.] — Type: *Wallich* 252 (K; iso BM, P), Burma, Rangoon.
- Davallia elegans* var. *subunidentata* Hook., Sp. Fil. (1845) 165. — Type: *Zollinger* 147 (K; iso BM, L, P).
- Davallia vogelii* Hook., Sp. Fil. (1845) 168, t. 59B. — Type: *Vogel* (K), Fernando Po.
- Davallia elegans* Hedw. var. *edentula* Hook., Sp. Fil. (1845) 165. — Type: *Griffith* 67 (n.v.), India, Mergui.
- Davallia elegans* Hedw. var. *polydactyla* T. Moore, Gard. Chron. (1881) 562. — Type: *Hort. Veitch* 1881 (K).
- Davallia impressa* Copel., Univ. Calif. Publ. Bot. 14 (1929) 377. — Type: *Bartlett* 6841 (A, K, L), Sumatra, E coast, Pulau off the coast from Batu Bara.
- Davallia schnellii* Tard.-Blot, Notul. Syst. (Paris) 13 (1949) 372, t. 1. — Type: *Schnell* 2734 (P), Africa, Guinée, massif de Jiamia.
- Davallia brevisora* Ching, Fl. Reip. Pop. Sin. 2 (1959) 377. — Type: *K.M. Feng* 13986 (PE; iso KUN), China, Yunnan, Mar li po, 20 Dec. 1947 (Ching cites nr. 13586, same date and locality).
- Wibelia multifida* auct.: Bernh., J. Bot. (Schrader) 1801 (1) (1801) 122, t. 1, f. 3.

Rhizome without the scales 3–15 mm diam., not white waxy. Scales red brown or nearly black, with pale border from base to apex or without pale border, narrowed evenly towards the apex or flat and nearly acicular, narrowed abruptly from a broad base, often curling backward, not bearing multiseptate hairs, toothed, peltate, 4–8 by 0.5–1.5 mm. Stipes pale, adaxially grooved, 4–50 cm long, glabrous or with few scales. Lamina compound, bipinnate or quadripinnate towards base and in the middle part, deltoid and broadest towards base, glabrous, 16–90 by 13–50 cm, not or slightly dimorphous. Longest petiolules 4–35 mm long. Pinnae deltoid. Longest pinnae 8–45 by 5–30 cm. Pinnules of at least the larger pinnae anadromous, deltoid. Longest pinnules 70–200 by 40–110 mm. Ultimate leaflets linear oblong or narrowly ovate, lobed almost to the midrib or only shallowly lobed. Ultimate segments 5–27 by 2–6 mm. Upper ridge at the junction of the costa and pinna-rhachis not swollen. Leaf axes glabrous. Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes pinnate (or forked in very narrow lobes), reaching the margin. False veins present. Sori separate, borne several on a segment, at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide or about as wide as long, 1–1.3 by 0.5–1 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin. Lamina generally extending into a tooth at both sides of a sorus.

Distribution – Generally common. Africa and Indian Ocean: Madeira, Tropical and South Africa, Madagascar, Comores, Seychelles, Christmas Island. Continental Asia: Sri Lanka, India (Assam and Andaman and Nicobar Is.), Thailand, Burma, China (Hainan), Indo-China (Laos, Cambodia, Vietnam). Malesia: throughout. Australia: Queensland. Pacific: Samoa, Society Islands (Tahiti).

Habitat & Ecology – Epiphyte on many different species of trees and in different types of forest including mangrove forest or on solitary trees, epilithic on granite, limestone, or sandstone, terrestrial on different kinds of soil, for instance on sand in kerangas; altitude 0–2200 m.

Note — *Davallia brevisora* Ching is a form with the false veins absent or inconspicuous.

b. var. *elata* (Forst.) Mett. ex Kuhn

Davallia denticulata Mett. ex Kuhn var. *elata* Mett. ex Kuhn in Miq., Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 288. — *Trichomanes elatum* Forst., Fl. Ins. Austr. (1786) n. 474. — *Davallia elata* Spreng., J. Bot. (Schrader) 1799 (2) (1800) 271; Sw., Syn. Fil. (1806) 131, 344; Willd., Spec. Pl. 5 (1810) 472; Spreng., Syst. Veg. 4 (1827) 120; Blume, Enum. Pl. Javae (1828) 236; De Vriese, Ned. Kruidk. Arch. 1 (1846) 16. — *Wibelia elata* Bernh., J. Bot. (Schrader) 1801 (1) (1801) 122, t. 1, f. 2. — *Humata elata* Desv., Prod. Fam. Foug. (1827) 325. — *Parestia elata* K. Presl, Epim. Bot. (1851) 100. — Type: *Forster 474* (= 300) (BM).

Trichomanes epiphyllum Forst., Fl. Ins. Austr. (1786) 85. — *Davallia epiphylla* Spreng., J. Bot. (Schrader) 1799 (2) (1800) 271; Sw., Syn. Fil. (1806) 134, 352; Schkuhr, Deutschl. Krypt. Gew. (1809) t. 127 B; Willd., Spec. Pl. 5 (1810) 473; Kuhn in Miq., Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286; Hoshiz., Bailey 21 (1981) 12, t. 6. — *Humata epiphylla* Desv., Prod. Fam. Foug. (1827) 325. — *Parestia epiphylla* K. Presl, Epim. Bot. (1851) 100. — Type: *Forster 471* (BM).

Davallia papuana Copel., Philipp. J. Sci., Bot. 6 (1911) 81; Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 229. — Type: *King 245* (n.v.).

Davallia bilabiata Hosok., Trans. Nat. Hist. Soc. Taiwan 26 (1936) 123. — Type: *Hosokawa 5882* (n.v., in herb. Taihoku Imp. Univ.), Carolines.

Davallia tenuisecta Copel., Philipp. J. Sci. 73 (1940) 355, t. 10. — Type: *Brass 11701* (A, BO, L), New Guinea, W Balim River.

Davallia dejoncheerii Hovenkamp & De Joncheere, Blumea 33 (1988) 408. — Type: *de Joncheere 1157* (L; iso KYO), Sulawesi, Central Sopa Valley above Talu.

Differs from the typical variety in the upper margin of the indusium being elongated, free from the leaf margin or not, or the indusium only attached at the base and part of the sides.

Distribution — Malesia: Philippines (Luzon, 7 coll.), Sulawesi (14 coll.), Moluccas (Buru, Banda, Babar, Ceram, Halmaheira, Ternate, Morotai, Aru Is.; 21 coll.), West New Guinea, (Lorentz R., Albatros bivak, Balim R.; 3 coll.), Papua New Guinea (many coll.). Pacific: Carolines (6 coll.); Solomons (2 coll.); Bougainville (3 coll.); New Caledonia (1 coll.); New Hebrides (5 coll.); Fiji (9 coll.); Samoa (many coll.); Rarotonga (1 coll.); Society Islands (many coll.).

Ecology — Epiphytic, epilithic, or terrestrial on different kinds of soil, in forest and on exposed places. Altitude 0–1600 m.

Note — This variety could have its origin in hybridization of *Davallia denticulata* var. *denticulata* with *D. embolostegia*. It has the same rhizome scales as *D. denticulata* var. *denticulata*. See also the note under *D. embolostegia*.

9. *Davallia divaricata* Blume

a. var. *divaricata*

Davallia divaricata Blume, Enum. Pl. Javae (1828) 237; Hook., Syn. Fil. (1868) 96; Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286; Clarke, Rev. Ferns N. India (1880) 445; Bedd., Handb. Ferns Brit. India (1883) 60; Christ, Verh. Naturf. Ges. Basel 2 (1897) 8; Bull. Herb. Boissier 6 (1898) 142; Copel., Publ. Bur. Sci. Gov. Lab. Philipp. 28 (1905) 54; Fern Fl. Philipp. (1958) 173; Holttum, Revis. Fl. Malaya 2, sec. ed. (1966) 362; Hoshiz., Bailey 21 (1981) 10, t. 4; Kato,

- J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 229. — *Araiostegia divaricata* Kato, Acta Phytotax. Geobot. 26 (1975) 158. — Type: *Blume* (L. sh 908.333-153; iso K), Java, G. Burangan.
- Davallia mucronata* Blume, Enum. Pl. Javae (1828) 235; Kunze, Bot. Zeitung (Berlin) (1848) 216. — Type: *Kuhl & van Hasselt* (L. sh 908.333-148), Java, Bogor.
- Davallia alata* J. Sm., J. Bot. 3 (1841) 417, nomen, non Blume. — *Davallia decurrens* Hook., Sp. Fil. (1845) 167, t. 44B; Copel., Publ. Bur. Sci. Gov. Lab. Philipp. 28 (1905) 54 — *Microlepia decurrens* Fée, Mém. Foug. 5, Gen. Filic. (1852) 326. — *Araiostegia decurrens* Kato, Acta Phytotax. Geobot. 26 (1975) 158. — Type: *Cuming* 350 (K; iso BM, P), Philippines, Bohol.
- Davallia longifolia* Roxb., Calc. J. Nat. Hist. 4 (1844) 514. — Type: *Roxburgh* (n.v.), Prince of Wales I.
- Davallia polyantha* Hook., Sp. Fil. (1845) 168, t. 59A; Bedd., Ferns Brit. India (1865) t. 107. — *Microlepia polyantha* Fée, Mém. Foug. 5, Gen. Filic. (1850) 327. — Type: *Lobb* (K), Singapore.
- Davallia lobbiana* T. Moore, Index Fil. (1861) 296; Baker in Hook. & Baker, Syn. Fil. (1868) 94; Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286. — Type: *Lobb* 1857 (K), Sarawak.
- Davallia formosana* Hayata, Mat. Fl. Formosa (1911) 430. — Type: *Nakahara s.n.*, Feb. 1907 (TI), Formosa, Taichu, Kashigatani.
- Davallia sumatrana* Copel., Philipp. J. Sci., Bot. 9 (1914) 230. — Type: *Brooks* 147 (BM, P), Sumatra.
- Davallia orientalis* C. Chr. in Wu, Bull. Dept. Biol. Sun Yatsen Univ. 3 (1932) 104, t. 43; Ibid. 6 (1933) 9. — Type: *Sin* 3698 (KYO, SYS), China, Yoa-hsiang, Kwangsi.
- Davallia austro-sinica* Ching, Fl. Reip. Pop. Sin. 2 (1959) 376. — Type: *Lau* SK 32 (PE), Kwangtung.
- Davallia amabilis* Ching, Fl. Reip. Pop. Sin. 2 (1959) 376. — Type: *Tsai Ke-hwa* 771 (PE), Yunnan, Hokou, Makai.

Rhizome without the scales 10–15 mm diam., not white waxy. *Scales* brown or red brown without pale border, narrowed evenly towards the apex, curling backward or not, not bearing multiseptate hairs, toothed, basifixed with cordate base and much overlapping lobes, 5–20 by 2–4 mm. Stipes pale, adaxially grooved, 15–60 cm long, glabrous or with few scales. *Lamina* compound, tripinnate, towards base and in the middle part, deltoid and broadest towards base, glabrous, 60–100 by 40–70 cm, not or slightly dimorphous. Longest petiolules 4–35 mm long. Pinnae deltoid. Longest pinnae 8–45 by 5–30 cm. Pinnules of at least the larger pinnae anadromous, deltoid. Longest pinnules 70–200 by 40–110 mm. Ultimate leaflets linear oblong or narrowly ovate, lobed halfway towards midrib or only shallowly lobed. Ultimate segments 5–27 by 2–6 mm. Rhachis adaxially distinctly grooved (often with a groove at either side). Upper ridge at the junction of the costa and pinna-rhachis not swollen. Leaf axes glabrous. Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes pinnate (or forked in very narrow lobes), reaching the margin. False veins absent. *Sori* separate, borne several on a segment, at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, about as wide as long, 1 by 1 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin. Lamina generally extending into a tooth at both sides of a sorus.

Distribution – Continental Asia: common from India to China (Yunnan, Fukien, Kwangsi, Guangdong, Taiwan, Hainan) southwards through SE Asia. Malesia: throughout. Pacific: Solomons (Bougainville, 1 coll.).

Habitat & Ecology – Generally epiphytic, sometimes epilithic on limestone, or bedrock not specified; rarely terrestrial. Mostly in dense forest, sometimes on dry places; altitude 0–1850 m.

b. var. *dimorpha* (Holttum) Noot., stat. nov.

Davallia dimorpha Holttum, Gard. Bull. Str. Settl. 9 (1937) 122; Revis. Fl. Malaya 2, sec. ed. (1966) 362. — *Araiostegia dimorpha* Kato, Acta Phytotax. Geobot. 26 (1975) 158. — Type: Holttum SF 31289 (SING; iso BM, BO, K), Malaya, Pahang, Cameron Highlands.

Lamina bipinnate or tripinnate towards base and in the middle part, strongly dimorphous. *Lamina* of sterile leaves bipinnate, or tripinnate, 40–60 by 25–50 cm. Longest pinnae 8–45 by 5–30 cm. Pinnules deltoid, 70–200 by 40–110 mm. *Lamina* of fertile leaves 40–60 by 25–50 cm (much more dissected than *lamina* of sterile leaves). Longest pinnae of fertile leaves 8–45 by 5–30 cm. Pinnules or pinna-lobes deltoid, 70–200 by 40–110 mm. *Sori* separate, frequently single on a segment, at the forking point of veins. Indusium also attached along the sides, pouch-shaped, semicircular, wider than long, 1 by 2 mm.

Distribution – Malesia: Malay Peninsula (Pahang, Cameron Highlands, 3 coll.).

Note – This is a local form of *Davallia divaricata* formerly described by Holttum as a species. However, except for the narrow segments of the fertile fronds and the broader indusia there is no difference.

10. *Davallia embolostegia* Copel.

Davallia embolostegia Copel., Philipp. J. Sci., Suppl. 1 (1906) 147, t. 3; Fern Fl. Philipp. (1958) 171; Hoshiz., Baileya 21 (1981) 12, t. 5; Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 230. — Type: Copeland 1914 (iso TI), Philippines, Luzon, Lepanto, Bagnen.

Rhizome without the scales 10–15 mm diam., not white waxy. *Scales* brown or red brown without pale border, narrowed evenly towards the apex, curling backward or not, not bearing multiseptate hairs, toothed, basifixed with cordate base and much overlapping lobes, 5–20 by 2–4 mm. Stipes pale, adaxially grooved, 15–60 cm long, glabrous or with few scales. *Lamina* compound, tripinnate, towards base and in the middle part, deltoid and broadest towards base, glabrous, 60–100 by 40–70 cm, not or slightly dimorphous. Longest petiolules 4–35 mm long. Pinnae deltoid. Longest pinnae 8–45 by 5–30 cm. Pinnules of at least the larger pinnae anadromous, deltoid. Longest pinnules 70–200 by 40–110 mm. Ultimate leaflets linear oblong or narrowly ovate, lobed halfway towards midrib. Ultimate segments 5–27 by 2–6 mm. Upper ridge at the junction of the costa and pinna-rhachis not swollen. Leaf axes glabrous. Margins of the *lamina* of each leaflet not thickened. Veins in sterile ultimate lobes pinnate (or forked in very narrow lobes), reaching the margin. False veins not present (rarely present and plant like *D. denticulata* var. *elata*). *Sori* separate, borne several on a segment (if one on a lobe, the lobe not narrowed at base), at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide, 1–1.5 by 0.3–0.5 mm, upper margin elongated, free, protruding beyond *lamina* margin. *Lamina* generally extending into a tooth at both sides of a sorus.

Distribution – Malesia: Sumatra (1 coll.); Borneo: Sarawak (1 coll.), Sabah (many coll.); Kalimantan Selatan (G. Besar, 1 coll.); Philippines (Luzon, Negros, Samar, Mindoro; many coll.); Moluccas (Ceram, Bacan, Halmahera, Ternate, Morotai; 7 coll.). Pacific: Samoa (Savaii I., 1 coll.).

Habitat & Ecology – Epiphyte, generally in primary forest, sometimes epilithic; altitude 0–2100 m.

Note – Hybridization with *Davallia denticulata* is probably rather common in the Philippines (confirmed by Dr. ?? Price, who told me that the two species merge in the Philippines); presumably collections with false veins are hybrids, sometimes they have the same shape of rhizome scales as *D. denticulata* but basally attached as in *D. embolostegia*.

11. *Davallia falcinella* (J. Sm.) K. Presl

Davallia falcinella K. Presl, Reliq. Haenk. 1 (1825) 66, t. 11, f. 2; Hook., Sp. Fil. (1845) 159. — *Leucostegia falcinella* J. Sm., J. Bot. 3 (1841) 416. — *Acrophorus falcinellus* T. Moore, Index Fil. (1857) 2. — *Humata falcinella* Copel., Publ. Bur. Sci. Gov. Lab. Philipp. 28 (1905) 51. — *Trogostolon falcinellus* Copel., Philipp. J. Sci. 34 (1927) 251, t. 4; Fern Fl. Philipp. (1958) 170. — Type: *Hance* (PRC), Philippines, Sorsogon, Luzon.

Rhizome without the scales 2.5–3 mm diam., not white waxy. *Scales* nearly black, without pale border, distinctly acicular, often curling backward, not bearing multi-septate hairs, with marginal setae at least in distal part, peltate, 6–10 by 2 mm. Stipes dark brown, adaxially grooved, 4–9 cm long, glabrous or with few scales. *Lamina* compound, tripinnate, or quadripinnate towards base and in the middle part, deltoid and broadest towards base, glabrous, 7–14 by 6–14 cm, not or slightly dimorphous. Longest petiolules 1–7 mm long. Pinnae linear-triangular. Longest pinnae 4–7 by 2–7 cm. Pinnules of at least the larger pinnae anadromous, linear oblong, or narrowly ovate. Longest pinnules 15–25 by 7–12 mm. Ultimate leaflets linear oblong, lobed almost to the midrib. Ultimate segments or lobes obtuse or acute without a tooth, 1–2(–4 in sterile leaves) by 1–2 mm. Upper ridge at the junction of the costa and pinna-rhachis not swollen. Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes frequently simple, not reaching the margin. False veins not present. *Sori* separate, frequently single on a segment, at the forking point of veins. Indusium attached at the base and only part of the sides, semicircular, about as wide as long, 1 by 1 mm. Lamina not extending into teeth beyond a sorus.

Distribution – Malesia: Philippines (Luzon 7 coll., Mindanao 4, Leyte 2, Negros 3, Samar 3). Pacific: Marquesas Islands (1 coll.).

Habitat & Ecology – Epiphyte; altitude 0–800 m.

12. *Davallia graeffei* Luerssen

Davallia graeffei Luerssen, Fil. Graeff. (1871) 211, t. 18. — Type: *Graeffe* 227 (P), Samoa, Savaii.

Rhizome without the scales 1.4–3 mm diam., white waxy under the scales. *Scales* brown, without pale border, narrowed evenly towards the apex, not or seldom curling backward, bearing multiseptate hairs at least when young, peltate, 5–7 by 1–1.5 mm. Stipes dark brown, adaxially grooved, 11–22 cm long, glabrous or with few scales. *Lamina* compound, tripinnate, or quadripinnate towards base and in the middle part, deltoid and broadest towards base, glabrous, 9–25 by 10–20 cm, strongly dimorphous, or not or slightly dimorphous. Longest petiolules 3–7 mm long. Pinnae deltoid or ovate. Longest pinnae 7–14 by 4–8 cm. Pinnules of at least the larger pin-

nae anadromous, ovate. Longest pinnules 2.5–5 by 1.5–4 mm. Ultimate segments of sterile compound leaves 5–15 by 2–4 mm. Ultimate leaflets linear oblong. Ultimate segments of fertile leaves 1.5–3 by 1–1.5 mm. Upper ridge at the junction of the costa and pinna-rhachis not swollen. Leaf axes glabrous. Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes pinnate, reaching the margin. False veins present. *Sori* separate, frequently single on a segment, at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide, 1 by 0.8 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin. Lamina generally extending into a tooth at both sides of a sorus.

Distribution – Pacific: New Hebrides (Aneityum, 1 coll.); Samoa (Savaii 4 coll., Upolu 5 coll., Tua Manua 1 coll.).

Habitat & Ecology – Not recorded.

13. *Davallia griffithiana* Hook.

Davallia griffithiana Hook., Sp. Fil. (1845) 168, t. 49B; Bedd., Ferns Brit. India (1865) t. 106; Hook., Syn. Fil. (1868) 96; Clarke, Rev. Ferns N. India (1880) 445; Bedd., Handb. Ferns Brit. India (1883) 60; Christ, Bull. Herb. Boissier 4 (1904) 616; Hoshiz., Bailey 21 (1981) 25, t. 13. — *Leucostegia griffithiana* J. Sm., Hist. Fil. (1875) 84. — *Humata griffithiana* C. Chr., Contr. U.S. Natl. Herb. 26 (1931) 293; Basu & Giri, J. Econ. Tax. Bot. 15 (1991) 119, t. 4, f. 5u–z. — Type: *Griffith 910* (K; iso L), India, Mishmee.

Humata tyermannii T. Moore, Gard. Chron. 1871 (1871) 870, t. 178; Hoshiz., Bailey 21 (1981) 44, t. 3. — *Davallia tyermannii* T. Moore, Gard. Chron. 1871 (1871) 871 (syn.). — Type: *Herb. Moore* (K).

Davallia platylepis Baker, Kew Bull. 1898 (1898) 229. — *Humata platylepis* Ching, Fl. Reip. Pop. Sin. 2 (1959) 311. — Type: *Henry 10082* (K), China, Yunnan, Mengtze.

Davallia henryana Baker, Kew Bull. 1906 (1906) 8. — *Humata henryana* Ching, Fl. Reip. Pop. Sin. 2 (1959) 312. — Type: *Henry 10082A* (K; iso BM, P), China, Yunnan, Mengtze.

Rhizome without the scales 3–6 mm diam., not white waxy. *Scales* whitish, brown, or red brown, without pale border, narrowed evenly towards the apex, curling backward or not, not bearing multiseptate hairs, with marginal setae at least in distal part, peltate, 6–9 by 1–1.5 mm. Stipes adaxially grooved, 6–24 cm long, glabrous or with few scales. *Lamina* compound, bipinnate or tripinnate towards base and in the middle part, deltoid and broadest towards base, glabrous, 10–32 by 8–27 cm, not or slightly dimorphous. Longest petiolules 2–10 mm long. Pinnae deltoid or linear. Longest pinnae 6–16 by 4–8 cm. Pinnules of at least the larger pinnae anadromous, linear oblong or narrowly ovate. Longest pinnules 25–100 by 7–60 mm. Ultimate leaflets narrowly ovate, lobed almost to the midrib or only halfway towards it. Ultimate segments or lobes obtuse or acute without a tooth, 2–5 by 2–3 mm. Upper ridge at the junction of the costa and pinna-rhachis not swollen. Leaf axes glabrous. Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes simple, forked or pinnate, not reaching the margin. False veins not present. *Sori* separate, borne several or single on a segment at the forking point of veins. Indusium attached at the base and only part of the sides, semicircular, about as wide as long, 1 by 1–2 mm, upper margin not elongated, truncate or slightly rounded, separated

from or even with lamina margin. Lamina generally extending into a tooth at both sides or only at the outside of a sorus, or not extending into teeth beyond a sorus.

Distribution – Continental Asia: India (Manipur, 1 coll.), Assam (14 coll.), Bhutan (3 coll.), Burma (1 coll.), Laos (3 coll.), Vietnam (3 coll.), Tibet (2 coll.), China (Chekiang, Kiangsi, Hunan, Szechuan, Kweichow, Fujian, Fukien, Quandong, Yunnan; many coll.), Taiwan (7 coll.), Japan (Okinawa, 1 coll.); not in Malesia.

Habitat & Ecology – Altitude 500–1530 m.

14. *Davallia heterophylla* J. Sm.

Davallia heterophylla J. Sm., Mém. Accad. Sci. Turin 5 (1793) 415; Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 288; Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 223. — *Humata heterophylla* Desv., Prod. Fam. Foug. (1827) 323; J. Sm., J. Bot. 3 (1841) 416; Hook., Sp. Fil. (1845) 152; Bedd., Ferns Brit. India (1865) t. 100; Hook., Syn. Fil. (1868) 88; Bedd., Handb. Ferns Brit. India (1883) 46; Christ, Bull. Herb. Boissier 6 (1898) 141, non Desvaux; Copel., Publ. Bur. Sci. Gov. Lab. Philipp. 28 (1905) 50; Holttum, Revis. Fl. Malaya 2, sec. ed. (1966) 366; Basu & Giri, J. Econ. Tax. Bot. 15 (1991) 111, t. 1, f. 1a–e. — Lectotype (here chosen): Charles Miller 1778 (BM).

Humata ophioglossa Cav., Descr. Pl. (1802) 273; Fée, Mém. Foug. 5, Gen. Filic. (1852) 322, t. 26A; C. Chr., Leaflet. Philipp. Bot. 9 (1933) 3161; Dansk Bot. Ark. 3, 9 (1937) 25; Copel., Fern Fl. Philipp. (1958) 180. — Type: *Née* (BM), Guam.

Humata pinnatifida Cav., Descr. Pl. (1802) 679. — *Davallia pinnatifida* Sw., Syn. Fil. (1806) 130. — Type: *Née* (BM), Marianas.

Davallia heterophylla J. Sm. var. *nervosa* Baker, J. Linn. Soc. Bot. 15 (1876) 105. — *Humata nervosa* Wagner & Grether, Univ. Calif. Publ. Bot. 23 (1948) 40, t. 12. — Type: *Moseley*, Challenger Exp. Admiralty Is. (BM, K, P), Pacific, Admiralty Is.

[*Davallia lobulosa* Wall., Cat. (1829) nr. 241, nomen.] — *Davallia longicauda* Christ, Bot. Jahrb. 23 (1896) 339. — Type: *Wallich* 241 (K, P), Malaya, Penang.

Rhizome without the scales 1.8–2.4 mm diam., white waxy under the scales. *Scales* red brown with pale border quickly diminishing or disappearing towards the apex, narrowed evenly towards the apex or flat and nearly acicular and narrowed abruptly from a broad base, curling backward (or appressed to rhizome, not crisped – only in the Pacific and New Guinea), not bearing multiseptate hairs, with marginal setae at least in distal part, peltate, 5–7 by 0.5–0.6 mm. Stipes pale, adaxially grooved or not, 0.5–7 cm long, glabrous or with few scales. *Lamina* simple, one entire to pinnatilobed leaf bearing multicellular hairs or glabrous, strongly dimorphous. Sterile lamina narrowly ovate (or ovate), 5–20 by 2–4.5 cm, margin flat or nearly so, not distinctly crenulate even towards apex. Fertile lamina linear or rarely pinnatifid, 4–16 by 0.5–2.5 cm. False veins not present. *Sori* separate at the forking point of veins. Indusium attached at the broad base and hardly or not at the sides, semicircular, wider than long, 1 by 1.5–2.5 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin.

Distribution – Continental Asia: India (Nicobar Is., 1 coll.), Peninsular Thailand (8 coll.), Cambodia (1 coll.), S Vietnam (3 coll.); Malesia: Sumatra, Malay Peninsula, Java, and Borneo (many coll.), Lesser Sunda Islands (Flores, 1 coll.); Philippines (Balabac, Paragua, Luzon, Polilo, Catanduanes, Leyte, Samar, Mindanao; many coll.), S Sulawesi (Lake Matano, Minahasa; 2 coll.); Moluccas (Ambon, Ceram, Aru

Is., Banda; 5 coll.), New Guinea (many coll.); Pacific: Palau Is., Admiralty Is., Bougainville, Solomons, Carolines, Marianas, Guam, Fiji, Tonga, Samoa (many coll.).

Habitat & Ecology – Epiphytic or epilithic, sometimes in swamp forest; altitude 0–900 m (once recorded from 2100 m on Mt Kaindi in Papua New Guinea).

Note – The presence of appressed scales in some collections from New Guinea and the Pacific seems to have no ecological base. They occasionally occur between normal collections. As there are no other differences I refrain from separating the collections with appressed scales taxonomically.

15. *Davallia hymenophylloides* (Blume) Kuhn

Davallia hymenophylloides Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286 — *Aspidium hymenophylloides* Blume, Enum. Pl. Javae (1828) 172. — *Leucostegia hymenophylloides* Bedd., Ferns S. India (1863) t. 252. — *Humata hymenophylloides* Copel., Publ. Bur. Sci. Gov. Lab. Philipp. 28 (1905) 51. — *Araiostegia hymenophylloides* Copel., Philipp. J. Sci. 34 (1927) 241; Noot., Blumea 37 (1992) 171. — Type: *Blume* (L sh 910.327-27, large sheet; not 909.30-114), Java, Mt Burangran.

[*Leucostegia affinis* J. Sm., J. Bot. 3 (1841) 416, p.p., nomen.] — *Davallia affinis* Hook., Sp. Fil. (1845) 158, t. 52B. — *Microlepia affinis* K. Presl, Epim. Bot. (1851) 97. — *Acrophorus affinis* T. Moore, Proc. Linn. Soc. London 2 (1854) 286. — *Humata affinis* Mett., Fil. Hort. Bot. Lips. (1856) 102, t. 27, f. 5, 6. — Type: *Cuming* 117 (K; iso A, BM, L, P, PE), Philippines.

Microlepia tenuifolia K. Presl, Epim. Bot. (1851) 97. — Type: *Cuming* 215 (iso A, BM, K, L, P), Philippines.

Cystopteris dalhousiana Fée, Mém. Foug. 8 (1857) 108. — Type: *Dalhousie*, in Herb. Delessert (G; iso K), Penang.

Rhizome without the scales 3–20 mm diam., not white waxy. Scales brown (membranaceous), without pale border, narrowed evenly towards the apex, often curling backward, not bearing multiseptate hairs, lacking marginal setae or teeth or those rare, basifixed with cordate base and much overlapping lobes, 4–7 mm long. Stipes dark brown, adaxially grooved, 9–45(–65) cm long, glabrous or with few scales. Lamina compound, tripinnate, elongate, often narrowing towards base, glabrous (or nearly so), 20–80(–90) by 6–50 cm, not or slightly dimorphous. Longest petiolules 2.5–30 mm long. Pinnae linear-triangular. Longest pinnae 4–30(–44) by 1.5–15(–18) cm. Pinnules of at least the larger pinnae anadromous, narrowly ovate. Longest pinnules 10–80 by 5–20 mm. Ultimate leaflets linear oblong. Ultimate segments or lobes obtuse or acute without a tooth. Leaf axes glabrous (or nearly so). Veins in sterile ultimate lobes frequently simple, not reaching the margin. False veins not present. Sori separate, frequently single on a segment at the bending point of a vein. Indusium reniform, attached at the narrow cordate base only, wider than long, 0.1–0.4 by 0.4–0.7 mm.

Distribution – Continental Asia: Sri Lanka (13 coll.); India (W Ghats, Darjeeling; 8 coll.); Thailand (1 coll.). Malesia: Sumatra (W Coast, Tapanuli, Bengkulu, E Coast, Aceh; 8 coll.); Malay Peninsula and Java (many coll.), Lesser Sunda Islands (Flores, 1 coll.); Borneo: Sarawak (8 coll.), Sabah (Kinabalu, many coll.), Kalimantan Barat (2 coll.), Kalimantan Selatan (1 coll.), Kalimantan Timur (6 coll.); Philippines (Luzon, Mindanao, Mindoro; many coll.).

Habitat & Ecology – Epiphytic or epilithic, rarely terrestrial; altitude 500–2200 m.

16. *Davallia leptocarpa* Mett.

Davallia leptocarpa Mett. in Kuhn, *Linnaea* 36 (1869) 143. — Type: *Cuming 56* (= *MacGillivray 56*) (K; iso L), New Hebrides, Aneityum.

Davallia macleayi Baker, *Syn. Fil.* (1874) 469. — Type: *Macleay* (K), Polynesia.

Rhizome without the scales 2–2.8 mm diam., white waxy under the scales. *Scales* red brown without pale border, narrowed evenly towards the apex, not or seldom curling backward, bearing multiseptate hairs at least when young, peltate, 11–12 by 1.5–2 mm. Stipes dark brown, adaxially grooved, 6–15 cm long, glabrous or with few scales. *Lamina* compound, bipinnate or tripinnate towards base and in the middle part, deltoid and broadest towards base, glabrous, 9–20 by 7–15 cm, not or slightly dimorphous. Longest petiolules 1–5 mm long. Pinnae narrowly ovate. Longest pinnae 4–10 by 2.5–5.5 cm. Pinnules of at least the larger pinnae anadromous, linear oblong. Longest pinnules 20–30 by 5–12 mm. Ultimate leaflets linear oblong, lobed almost to the midrib. Ultimate segments 2–4 by 1–1.5 mm. Upper ridge at the junction of the costa and pinna-rhachis not swollen. Leaf axes glabrous. Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes forked, reaching the margin. False veins not present. *Sori* separate, frequently single on a segment at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide, 1.3–1.5 by 0.5 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin. Lamina generally extending into a tooth at both sides of a sorus.

Distribution – Pacific: New Hebrides (Aneityum, only 3 coll.).

Habitat & Ecology – Hanging from trees in mountain woods.

17. *Davallia membranulosa* Wall. ex Hook.

Davallia membranulosa Wall. [Cat. (1829) nr. 255, nomen] ex Hook., *Sp. Fil.* (1845) 159; Clarke, *Rev. Ferns N. India* (1880) 442. — *Acrophorus membranulosus* T. Moore, *Proc. Linn. Soc. London* 2 (1854) 286. — *Leucostegia membranulosa* Bedd., *Ferns Brit. India* (1865) t. 98; Hook., *Syn. Fil.* (1868) 91; J. Sm., *Hist. Fil.* (1875) 84; Bedd., *Handb. Ferns Brit. India* (1883) 50. — *Humata membranulosa* Diels in Engl. & Prantl, *Nat. Pflanzenfam.* 1, 4 (1899) 209. — *Davallodes membranulosum* Copel., *Philipp. J. Sci.* 34 (1927) 245; Noot., *Blumea* 37 (1992) 182. — *Paradavallodes membranulosum* Ching, *Acta Phytotax. Sin.* 11 (1966) 20. — *Araiostegia membranulosa* Holttum, *Kew Bull.* 27 (1972) 230. — Type: *Wallich 255* (K; iso P), Nepal. *Davallodes chingiae* Ching, *Fl. Reip. Pop. Sin.* 2 (1959) 375. — *Paradavallodes chingiae* Ching, *Acta Phytotax. Sin.* 11 (1966) 20. — Type: *K. M. Feng 13127* (PE; iso KUN), China, Yunnan, Mar Li Po.

Rhizome without the scales 2–4 mm diam. *Scales* brown, red brown, or nearly black, with pale border from base to apex, narrowed evenly towards the apex, not bearing multiseptate hairs, lacking marginal setae or teeth or those rare, peltate, 5–6 mm long. Stipes pale, adaxially grooved, 3–15 cm long, bearing hairs and or scales when young. *Lamina* compound, bipinnate towards base and in the middle part, elongate, not or hardly narrowed towards base, bearing multicellular hairs, 12–27 by 5–14 cm, not or slightly dimorphous. Longest petiolules 0.5–1.5 mm long. Pinnae linear-triangular. Longest pinnae 2.6–7 by 1–3 cm. Pinnules of at least the larger pinnae catadromous or anadromous (but often opposite), linear oblong (pinnatipartite, the lobes

entire or shallowly lobed). Longest pinnules 6–15 by 2–4 mm. Leaf axes, at least rhachises, hairy. Hairs 0.4–0.6 mm long. Veins in sterile ultimate lobes simple or forked, not reaching the margin. False veins not present. *Sori* separate, frequently single on a segment at the forking point of veins or (rarely) at the bending point of a vein. Indusium attached at the broad base and hardly or not at the sides, semicircular or oblong (to circular), longer than wide to wider than long, 0.5–0.8 by 0.5–0.8 mm.

Distribution – Continental Asia: India (5 coll.); Sikkim (1 coll.), Nepal (2 coll.), Burma (1 coll.); N Thailand (17 coll.); Vietnam (Tonkin, 1 coll.); China (Sichuan, Yunnan; 9 coll.).

Habitat & Ecology – Epilytic or epiphytic in forest; altitude 600–2600 m.

Spores – Surprisingly, two kinds of spores are found in this species. *Feng 13127* has coarse verrucae coherent in parallel rows at the distal face, while *Maxwell 88-847* shows finely colliculate verrucae. This difference is not matched, however, with morphological traits.

18. *Davallia multidentata* Hook.

Davallia multidentata Hook., Syn. Fil. (1868) 91; Clarke, Rev. Ferns N. India (1880) 442. — [*Aspidium multidentatum* Wall., Cat. (1829) nr. 346, nomen.] — *Leucostegia multidentata* Bedd., Ferns Brit. India (1869) t. 313; Handb. Ferns Brit. India (1883) 50. — *Humata multidentata* Diels in Engl. & Prantl, Nat. Pflanzenfam. 1, 4 (1899) 209. — *Araiostegia multidentata* Copel., Philipp. J. Sci. 34 (1927) 241; Ching, Fl. Reip. Pop. Sin. 2 (1959) 295; Noot., Blumea 37 (1992) 173. — *Paradavallodes multidentatum* Ching, Acta Phytotax. Sin. 11 (1966) 20. — Type: Wallich 346 (K; iso BM), Himalayas.

[*Acrophorus thomsoni* T. Moore, Index Fil. (1857) 4, nomen. — Type: Hooker f. & Thomson 316 (BM), India.]

Microlepia pteropus Bedd., Ferns Brit. India (1869) t. 313. — Type: unknown.

Paradavallodes kansuense Ching, Acta Phytotax. Sin. 11 (1966) 20. — Type: Y. B. Hsu 1726 (PE), China, Kansu, Wen Hsien.

Rhizome without the scales 5 mm diam. (with scales c. 10), not white waxy. Scales brown without pale border, narrowed evenly towards the apex, often curling backward, not bearing multiseptate hairs, lacking marginal setae or teeth or toothed, basifixed with cordate base and much overlapping lobes, 6 mm long. Stipes pale or dark brown, adaxially grooved, 17–25 cm long, glabrous or with few scales. *Lamina* compound, tripinnate, deltoid and broadest towards base, glabrous, 30–45 by 17–34 cm, not or slightly dimorphous. Longest petiolules 8–10 mm long. Pinnae linear-triangular. Longest pinnae 10–19 by 6–9 cm. Pinnules of at least the larger pinnae anadromous, narrowly ovate. Longest pinnules 40–70 by 15–30 mm. Ultimate leaflets linear oblong, lobed halfway towards midrib. Ultimate segments or lobes obtuse or acute without a tooth, 2–4 by 1 mm (often shallowly lobed). Leaf axes, at least rhachises, hairy. Hairs 0.1–0.2 mm long. Veins in sterile ultimate lobes simple or forked, not reaching the margin. False veins not present. *Sori* separate, often single on a segment at the forking point of veins or at the bending point of a vein. Indusium reniform, attached at the narrow cordate base only, wider than long, 0.5 by 0.6–0.8 mm.

Distribution – Continental Asia: India (Darjeeling, Manipur, Assam, 11 coll.), Sikkim (2 coll.); Nepal (14 coll.); China (Sichuan, Kansu, Yunnan; 16 coll.).

Habitat & Ecology – Altitude 1200–2100 m.

19. *Davallia parvula* Wall. ex Hook. & Grev.

Davallia parvula Wall. [Cat. (1829) nr. 247] ex Hook. & Grev., Icon. Filic. (1829) t. 138; Hook., Syn. Fil. (1868) 92; Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286. — *Acrophorus parvulus* T. Moore, Proc. Linn. Soc. London 2 (1854) 286; Bedd., Ferns Brit. India (1865) t. 97. — *Humata parvula* Mett., Fil. Hort. Bot. Lips. (1856) 102, t. 27, f. 7, 8; Holttum, Revis. Fl. Malaya 2, sec. ed. (1966) 369. — *Leucostegia parvula* Bedd., Handb. Ferns Brit. India (1883) 54. — Type: Wallich 247 (K; iso BM, L, P), Singapore.

Rhizome without the scales 0.5–1.2 mm diam., white waxy under the scales. Scales red brown without pale border, narrowed evenly towards the apex, not or seldom curling backward, not bearing multiseptate hairs, with marginal setae at least in distal part, peltate, 2.5–6 by 0.3–0.6 mm. Stipes dark brown, adaxially grooved, 0.1–5 cm long, glabrous or with few scales. Lamina compound, entirely divided into fine linear segments without obvious rhachis, deltoid and broadest towards base, glabrous, 0.6–4 by 0.5–3.5 cm, not or slightly dimorphous. Longest petiolules 1–2 mm long. Pinnules of at least the larger pinnae anadromous. Ultimate segments or lobes obtuse or acute without a tooth, 0.5–4 by 0.2–0.4 mm. Ultimate segments of sterile compound leaves 0.2–0.4 mm broad. Upper ridge at the junction of the costa and pinna-rhachis not swollen. Leaf axes glabrous. Veins in sterile ultimate lobes frequently simple, reaching the margin. False veins not present. Sori separate, frequently single on a segment at the forking point of veins. Indusium attached at the broad base and hardly or not at the sides, semicircular or more or less triangular to rhomboid, about as wide as long, 0.3–0.8 by 0.3–0.8 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin. Lamina generally extending into a tooth at both sides of a sorus.

Distribution – Malesia: Sumatra (E Coast, Bangka, Lingga Arch.; 5 coll.), Singapore (2 coll.); Borneo: Sarawak (8 coll.), Brunei (1 coll.), Sabah (Sandakan, 3 coll.), Kalimantan Barat (1 coll.), Kalimantan Tengah (Sampit, 1 coll.), Kalimantan Timur (3 coll.); Papua New Guinea (many coll.).

Habitat & Ecology – Epiphytic or epilithic; altitude 0–800 m.

Note – *Davallia parvula* is closely related to *D. repens*. It is not easy to separate these species; probably there are hybrids between some more dissected forms of *D. repens* and *D. parvula*.

20. *Davallia pectinata* J. Sm.

Davallia pectinata J. Sm., Mém. Accad. Sci. Turin 5 (1793) 415; Sw., Syn. Fil. (1806) 130; Willd., Spec. Pl. 5 (1810) 465; Spreng., Syst. Veg. 4 (1827) 118; Hook. & Grev., Icon. Filic. (1831) t. 139; Hook., Sp. Fil. (1845) 153; Alston, Philipp. J. Sci. 50 (1933) 175. — *Humata pectinata* Desv., Prod. Fam. Foug. (1827) 323; J. Sm., J. Bot. 3 (1841) 416; Copel., Fern Fl. Philipp. (1958) 178; Holttum, Revis. Fl. Malaya 2, sec. ed. (1966) 369; De Joncheere, Gard. Bull. Sing. 30 (1977) 45; Basu & Giri, J. Econ. Tax. Bot. 15 (1991) 111, t. 2, f. 3f–j. — *Pachypleuria pectinata* K. Presl, Epim. Bot. (1849) 98; Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 231. — Type: *D. Hurloch* 1786 (n.v.), India Orientalis.

Nephrodium gaimardianum Gaud. in Freyc., Voy. Uranie (1827) 335, t. 12, f. 1. — *Davallia gaimardiana* K. Presl, Tent. Pterid. (1836) 128; Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286. — *Humata gaimardiana* J. Sm., J. Bot. 3 (1841) 415; Lond. J. Bot. 1 (1842) 425; Copel., Publ. Bur. Sci. Gov. Lab. Philipp. 28 (1905) 50. — Type: *Gaudichaud* (P), Île Rawak.

- Davallia intermarginalis* Blume, Enum. Pl. Javae (1828) 230. — *Pachypleuria intermarginalis* K. Presl, Epim. Bot. (1851) 98. — *Humata intermarginalis* T. Moore, Index Fil. (1861) 296. — Type: *Blume s.n.* (L sh 908.275-76), W Java.
- Prosaptia pinnatifida* K. Presl, Tent. Pterid. (1836) 166. — Type: *Meyen herb.* (n.v.), Luzon.
- Davallia multiflora* Roxb., Fl. Ind. 4 Crypt. (Calc. J. Nat. Hist. 4) (1844) 53. — *Davallia parallela* Wall. [Cat. (1829) nr. 251, nomen] ex Hook., Sp. Fil. (1845) 153. — *Pachypleuria parallela* K. Presl, Epim. Bot. (1851) 98, pro spec. Philipp. — *Pteroneuron parallelum* Fée, Mém. Foug. 5, Gen. Filic. (1852) 320. — *Humata parallela* Brack., U.S. Expl. Exped., Filic. 16 (1854) 229; Bedd., Ferns Brit. India (1865) t. 99; Hook., Syn. Fil. (1868) 89; Bedd., Handb. Ferns Brit. India (1883) 47. — Type: *Wallich 251* (K, P), Singapore.
- Davallia parallela* var. *a* Hook., Sp. Fil. 1 (1845) 153. — Type: *Cuming 61* (K; iso A, BM, L, P), Philippines.
- Humata lanuginosa* Alderw., Bull. Jard. Bot. Buitenzorg III, 3 (1920) 155. — Type: *Bünnemeijer 3881* (BO; iso K, L, P), Sumatra, W Coast, G. Malintang.
- Humata melanophlebia* Copel., B. P. Bishop Mus. Bull. 93 (1932) 11, t. 12A. — Type: *Grant 5144* (n.v.), Tahaa, Ohiri.
- Humata huahinensis* Copel., B. P. Bishop Mus. Bull. 93 (1932) 11, t. 12B. — Type: *Grant 5295* (n.v.), Huahine, Matoreere.
- Humata banksii* Alston, Philipp. J. Sci. 50 (1933) 176. — Type: *Banks 1769* (BM), Tahiti.
- Humata archboldii* Copel., Philipp. J. Sci. 73 (1940) 350, t. 4. — Type: *Brass 13301* (A, BM, BO, L), West New Guinea, Idenburg River, Bernhard Camp.
- Humata tenuivenia* Copel., Philipp. J. Sci. 73 (1940) 350, t. 3. — Type: *Brass 14082* (A, BM, BO, L), West New Guinea, Idenburg River, Bernhard Camp.
- Humata trukensis* H. Itô in Nakai, Iconogr. Pl. As. Orient. 4 (1941) 375, t. 121. — Type: *H. Itô* (TI), 29-iii-1941, Micronesia, Mt Tonoman, Totowasi.

Rhizome without the scales 1.4–2.6 mm diam., white waxy under the scales. *Scales* red brown, with pale border from base to apex, narrowed evenly towards the apex, not or seldom curling backward, bearing multiseptate hairs at least when young, peltate, 5 by 1.1–1.5 mm. Stipes pale or dark brown, adaxially grooved, 5–18 cm long, glabrous or with few scales. *Lamina* simple, one pectinate or pinnatifid leaf, narrowly ovate, elongate, often narrowing towards base, bearing multicellular hairs or glabrous, 4–21 by 2.5–8 cm, not or slightly dimorphous. Longest pinnae 1.5–3.2 by 0.3–0.5 cm. False veins not present. *Sori* separate at the forking point of veins or at the bending point of a vein. Indusium attached at the broad base and hardly or not at the sides, semicircular, wider than long or about as wide as long, 0.6–0.8 by 0.6–1 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin. In some collections, for instance *Brass 13301* from New Guinea, the type of *Humata archboldii* Copel., and *Posthumus s.n.* from Java, the scales are not hairy, and have no white margin.

Distribution – Continental Asia: India (S Andaman, and Nicobar Is., 3 coll.), China, Taiwan (Orchid I., 1 coll.), Cambodia (1 coll.); Thailand (2 coll.); Malesia: Sumatra (many coll.), Malay Peninsula (Langkawi Is., Kelantan, Pahang, Malacca, Johore; 5 coll.), Singapore (2 coll.); Anambas Is. (1 coll.); W Java (3 coll.); Borneo: Sarawak (2 coll.), Brunei (1 coll.), Sabah (3 coll.), Kalimantan Barat (1 coll.), Kalimantan Selatan (2 coll.), Kalimantan Timor (11 coll.); Philippines throughout but quite rare; Sulawesi (central, 6 coll., northern, 1 coll.); Moluccas (Ambon, Ceram, Talaud Is., Tanimbar Is., Aru Is., Kobroor, Ternate; 11 coll.); Papua New Guinea incl. Bismarck Archipelago (many coll.); Australia: N Queensland (1 coll.); Pacific: Truk Is. (1 coll.),

Solomons (6 coll.), New Hebrides (5 coll.), New Caledonia (2 coll.), Samoa (5 coll.), Carolines (10 coll.), Society Islands (many coll.).

Habitat & Ecology – Epiphytic, epilithic, or sometimes terrestrial, on sand, lava, or limestone.

21. *Davallia pulchra* D. Don

Davallia pulchra D. Don, Prod. Fl. Nepal. (1825) 11; C. B. Clarke, Rev. Ferns N. India (1880) 444; Baker, Kew Bull. 1895 (1895) 53. — *Davallia chaerophylla* [Wall., Cat. (1829) nr. 259, nomen] K. Presl, Tent. Pterid. (1836) 129; Hook., Sp. Fil. (1846) 157, t. 51A; Fée, Mém. Foug. 5, Gen. Filic. (1852) 329. — *Leucostegia pulchra* J. Sm., Lond. J. Bot. 1 (1842) 426; Bedd., Handb. Ferns Brit. India (1883) 52. — *Acrophorus chaerophyllus* T. Moore, Proc. Linn. Soc. London 2 (1854) 286. — *Humata chaerophylla* Mett., Fil. Hort. Bot. Lips. (1856) 102, t. 27, f. 9, 10. — *Acrophorus pulcher* T. Moore, Index Fil. (1857) 3; Bedd., Ferns S. India (1863) t. 10. — *Humata pulchra* Diels in Engl. & Prantl, Nat. Pflanzenfam. 1, 4 (1899) 209. — *Araiostegia pulchra* Copel., Philipp. J. Sci. 34 (1927) 241; Ching, Fl. Reip. Pop. Sin. 2 (1959) 288; Tagawa & Iwatsuki, Acta Phytotax. Geobot. 24 (1970) 180; Noot., Blumea 37 (1992) 173. — Type: *Wallich 259* (K; iso BM, L, P), Nepal.

Cystopteris squamata Decne. in Jacquem., Voy. Inde 4 (1844) 178, t. 178. — Type: *Jacquemont* (P). *Davallia pseudocystopteris* Kunze, Bot. Zeitung (Berlin) (1850) 68. — *Acrophorus pseudocystopteris* Bedd., Ferns Brit. India (1865) t. 92. — *Leucostegia pseudocystopteris* Bedd., Ferns Brit. India (1865) t. 92; Handb. Ferns Brit. India (1883) 54. — *Davallia pulchra* D. Don var. *pseudocystopteris* C. B. Clarke, Rev. Ferns N. India (1880) 444. — *Araiostegia pseudocystopteris* Copel., Philipp. J. Sci. 34 (1927) 241; Tagawa & Iwatsuki, Acta Phytotax. Geobot. 24 (1970) 181. — Type: *Colonel Dyas* (K), India, Dalhousie (SW Himalayas).

Davallia pulchra D. Don var. *delavayi* Bedd. ex C. B. Clarke & Baker, J. Linn. Soc. Bot. 24 (1888) 410. — *Leucostegia delavayi* Ching in C. Chr., Index Filic. Suppl. 3 (1934) 120. — *Araiostegia delavayi* Ching, Fl. Reip. Pop. Sin. 2 (1959) 289. — Type: *Delavay* (K; iso BO), China, Yunnan, Ki-chan.

Davallia yunnanensis Christ, Bull. Herb. Boissier 6 (1898) 970. — *Davallia rigidula* Baker, Kew Bull. 1906 (1906) 8. — *Araiostegia yunnanensis* Copel., Philipp. J. Sci. 34 (1927) 241; Ching, Fl. Reip. Pop. Sin. 2 (1959) 290; Tagawa & Iwatsuki in Basu & Panigrahi, J. Econ. Taxon. Bot. 5 (1984) 850. — *Leucostegia yunnanensis* C. Chr., Index Filic. Suppl. 3 (1934) 121. — *Humata yunnanensis* Ching, Bull. Fan Mem. Inst. Biol. ser. II, 1 (1949) 296. — Type: *Henry 10333 A* (K), China, Yunnan, Mengtze.

Davallia beddomei Hope, J. Bomb. Nat. Hist. Soc. 12 (1899) 527, t. 1. — *Araiostegia beddomei* Ching, Fl. Reip. Pop. Sin. 2 (1959) 288. — Lectotype: *Bliss* ex Hope herb. (BM; iso P), India, Simla, Mt Kamalhari.

Davallia ahamantica Christ, Bull. Soc. Bot. France 52 (1905) 65. — *Araiostegia ahamantica* Copel., Philipp. J. Sci. 34 (1927) 241. — Lectotype (here chosen): *Delavay 1155* (K; iso P), China, Yunnan.

Araiostegia imbricata Ching, Fl. Reip. Pop. Sin. 2 (1959) 376; Tagawa & Iwatsuki, Acta Phytotax. Geobot. 24 (1970) 180. — Type: *C. W. Wang 78372* (KUN), China, Yunnan, Cheh Li Hsien.

Rhizome without the scales 2–6 mm diam., not white waxy. *Scales* brown (often greyish), without pale border, broad, ovate to oblong-subdeltoid with round to acute apex, appressed to rhizome, usually crisped, margins recurved, not bearing multisepate hairs, lacking marginal setae or teeth or those rare, basifixed with cordate base and much overlapping lobes, 2–5 mm long. Stipes pale, adaxially grooved, 10–20 cm long, glabrous or with few scales (sometimes with more scales). *Lamina* compound, tripinnate or quadripinnate, deltoid and broadest towards base, to elongate, often narrowing towards base, glabrous, 12–50 by 7–40 cm, not or slightly dimor-

phous. Longest petiolules 3–20 mm long. Pinnae deltoid or linear-triangular. Longest pinnae 5–21 by 3–12 cm. Pinnules of at least the larger pinnae anadromous, linear oblong or narrowly ovate. Longest pinnules 25–70 by 10–35 mm. Ultimate leaflets linear oblong, lobed almost to the midrib (each lobe bilobed again). Ultimate segments or lobes obtuse or acute without a tooth, 0.5–3 by 0.6–1 mm. Leaf axes glabrous. Veins in sterile ultimate lobes frequently simple, not reaching the margin. False veins not present. *Sori* separate, frequently single on a segment at the forking point of veins or at the bending point of a vein. Indusium reniform or semicircular, attached at the narrow, cordate base only, wider than long, 0.5–0.8 by 0.5–1 mm.

Distribution – Continental Asia: common from Sri Lanka through India, Nepal, Sikkim, and Bhutan; Tibet (5 coll.), S China (Szechuan, Kweichow, Yunnan; many coll.); Burma (5 coll.), N Thailand and N Vietnam (many coll.), Laos (1 coll.).

Habitat & Ecology – Epiphytic and epilithic on granite and limestone; altitude 450–3500 m.

22. *Davallia repens* (L. f.) Kuhn — Plates 6–9

Davallia repens Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286; Filic. Decken. (1867) 27. — *Adiantum repens* L. f., Suppl. Pl. (1781) 446. — *Humata repens* Diels in Engl. & Prantl, Nat. Pflanzenfam. 1, 4 (1899) 209; Copel., Publ. Bur. Sci. Gov. Lab. Philipp. 28 (1905) 50; Fern Fl. Philipp. (1958) 178; Holttum, Revis. Fl. Malaya 2, sec. ed. (1966) 371; Basu & Giri, J. Econ. Tax. Bot. 15 (1991) 115, t. 3k–o. — Type: *Sonnerat par Thouin (Commerson)* 74 (P; iso L), Mascareignes, Ile de France.

Davallia pedata J. Sm., Mém. Accad. Sci. Turin 5 (1793) 414, 415; Sw., Syn. Fil. (1806) 131, 341; Blume, Enum. Pl. Javae (1828) 230; Hook., Sp. Fil. (1845) 154; Harrington, J. Linn. Soc. Bot. 16 (1877) 26; Clarke, Rev. Ferns N. India (1880) 442; Christ, Bull. Herb. Boissier 6 (1898) 141. — *Humata pedata* J. Sm., J. Bot. 3 (1841) 416; Lond. J. Bot. 1 (1842) 475; Bedd., Ferns S. India (1863) t. 12; Hook., Syn. Fil. (1868) 89; Bedd., Handb. Ferns Brit. India (1883) 48. — *Pachypleuria pedata* K. Presl, Epim. Bot. (1851) 98. — Type: *Walker* (P), Ceylon.

Humata trifoliata Cav., Descr. Pl. (1802) 273; C. Chr., Dansk Bot. Ark. 39 (1937) 26; Copel., Fern Fl. Philipp. (1958) 177. — *Pachypleuria trifoliata* K. Presl, Epim. Bot. (1851) 98. — Type: *Née* (BM), Pacific, Mariana Islands.

Davallia serrata Willd., Spec. Pl. 5 (1810) 467; Desv., Prod. Fam. Foug. (1827) 323; Spreng., Syst. Veg. 4 (1827) 118; Hook., Sp. Fil. (1845) 154. — *Humata serrata* Brack., U.S. Expl. Exped., Filic. 16 (1854) 230. — Type: *Willdenow* (n.v.), Pacific, Mariana Islands.

Davallia pedata var. *minor* Nees & Blume, Nov. Act. Acad. Caes. Leop. Nat. Cur. 11 (1823) 122, t. 13, f. 1. — Type: *Blume* (n.v.).

Davallia pellucida Desv., Prod. Fam. Foug. (1827) 316. — Type: Mascareignes (n.v.).

Davallia subimbricata Blume, Enum. Pl. Javae (1828) 231. — *Pachypleuria subimbricata* K. Presl, Epim. Bot. (1851) 261. — Type: *Blume* (L sh 908.275-807), Java.

Davallia alpina Blume, Enum. Pl. Javae (1828) 231; Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286; Christ, Verh. Naturf. Ges. Basel 2 (1897) 6. — *Humata alpina* T. Moore, Index Fil. (1857) XCII. — Type: *Blume* (L sh 908.275-905), Java, G. Gedéh.

Davallia vestita Blume, Enum. Pl. Javae (1828) 233; Hook., Sp. Fil. (1845) 156; Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286; Harrington, J. Linn. Soc. Bot. 16 (1877) 26; Christ, Verh. Naturf. Ges. Basel 2 (1897) 6; Bull. Herb. Boissier 6 (1898) 142. — *Pachypleuria vestita* K. Presl, Epim. Bot. (1851) 261; Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 232. — *Humata vestita* T. Moore, Index Fil. (1857) XCII; Copel., Publ. Bur. Sci. Gov. Lab. Philipp. 28 (1905) 50; Fern Fl. Philipp. (1958) 177; Holttum, Revis. Fl. Malaya 2, sec. ed. (1966) 370; Bedd., Ferns S. India (1863) t. 253. — Type: *Blume* (L sh 908.275-969), Java, G. Burangan.

- Davallia bipinnatifida* Blume, Enum. Pl. Javae (1828) 234. — *Humata bipinnatifida* T. Moore, Index Fil. (1861) 290. — Type: *Blume* (?) Java.
- Davallia belangeri* Bory in Bélanger, Voy. Indes Or. 2 (1833) 72, t. 7, f. 1. — Type: *Bélanger* (P).
- Davallia lepida* K. Presl [Tent. Pterid. (1836) 128, nomen] ex Goldmann, Nov. Act. Acad. Caes. Leop. Nat. Cur. Suppl. 1, 19 (1843) 464. — *Pachypleuria lepida* K. Presl, Epim. Bot. (1851) 99. — *Humata lepida* T. Moore, Index Fil. (1857) 92. — Type: *Meyen* (K), Manila, 1831.
- Davallia cordifolia* Roxb., Calcutta J. Nat. Hist. 4 (1844) 514. — Type: *Roxburg* (n.v.), native of the mountains north of Rohilcund.
- Davallia cumingii* Hook., Sp. Fil. (1845) 155, t. 45B; Brack., U.S. Expl. Exped., Filic. 16 (1854) 230; Copel., Publ. Bur. Sci. Gov. Lab. Philipp. 28 (1905) 51. — Type: *Cuming 138* (A, BM, K, L, P), Philippines, Samar.
- Davallia longula* Kunze, Bot. Zeitung (Berlin) 6 (1848) 215. — *Humata longula* T. Moore, Index Fil. (1861) 296. — Type: *Zollinger 3182* (BM, L), Java.
- Humata botrychioides* Brack., U.S. Expl. Exped., Filic. 16 (1854) 231, t. 32, f. 1; Christ, Bull. Herb. Boissier 6 (1898) 142; Copel., Publ. Bur. Sci. Gov. Lab. Philipp. 28 (1905) 51; Brownlie, Pterid. Fl. Fiji (1977) 160. — *Davallia botrychioides* Baker, Syn. Fil. (1867) 90. — Type: *Brackenridge* t. 32.
- Davallia pusilla* Mett., An. Sci. Nat. Bot. IV, 15 (1861) 79. — *Humata pusilla* Seem., Fl. Vit. (1873) 335. — *Pachypleuria pusilla* Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 231. — Lectotype (here chosen): *Viellard 1627* (P; iso BM, K), New Caledonia no 93, Wagap.
- Davallia repens* var. *bipinnatifida* Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 287. — Type: *Zollinger 3128* (n.v.), Java, Bandung.
- Davallia anderssonii* Mett. in Kuhn, Linnaea 36 (1869) 143. — *Humata anderssonii* C. Chr., Index Filic. (1906) 353. — Type: *Andersson* (BM), Tahiti.
- [*Humata rigida* Carruth. ex Seem., Fl. Vit. (1873) 335, nomen.] — *Davallia rigida* Hook. & Baker, Syn. Fil. (1874) 467. — Type: *Banks & Solander* (BM), Society Islands.
- [*Humata multifida* Carruth. ex Seem., Fl. Vit. (1873) 335, nomen] ex Brownlie, Pacific Sci. 14 (1960) 401. — *Davallia multifida* Baker in Hook. & Baker, Syn. Fil. ed. 2 (1874) 467, non Spreng. — Type: *MacGillivray* (n.v.), Aneityum.
- Davallia pinnatifida* Baker, J. Linn. Soc. Bot. 24 (1887) 257 (non Sw., 1806). — *Humata intermedia* C. Chr., Index Filic. (1906) 353; Copel., Univ. Calif. Publ. Bot. 12 (1931) 401; Fern Fl. Philipp. (1958) 178. — Type: *Hose 179* (K, BM), Borneo, Sarawak, Niah.
- Davallia bipinnatifida* Baker, Kew Bull. (1899) 119 (non Blume, 1828). — *Humata neoguineensis* C. Chr., Index Filic. (1906) 354. — Type: *Giulianetti & English* (K), New Guinea, Vanape Valley.
- Humata repens* var. *minuscule* C. Chr., Philipp. J. Sci. 3C (1908) 272. — *Humata minuscule* Alderw., Malayan Ferns Suppl. (1917) 216. — Type: *BS 1815 (Ramos)* (P), Luzon, Rizal Prov.
- Humata introrsa* Christ, Nova Guinea 8 (1909) 160. — Type: *Versteeg 1279* (BO, K, L, P), 20-vi-1907, New Guinea, Lorentz River.
- Humata obtusata* Alderw., Bull. Jard. Bot. Buitenzorg II, 1 (1911) 8; Copel., Fern Fl. Philipp. (1958) 176. — *Pachypleuria obtusata* Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 232. — Type: *BS 8386 (MacGregor)* (BO; iso L, P), Luzon, Benguat Prov., Pauai.
- Humata subtilis* Alderw., Bull. Jard. Bot. Buitenzorg II, 7 (1912). — Type: *Schlechter 13788* (BO; iso BM, K), New Guinea, New Mecklenburg near Punam.
- Humata crassifrons* Alderw., Bull. Jard. Bot. Buitenzorg II, 7 (1912) 18. — Type: *Schlechter 14430* (BO; iso BM, K), New Guinea, Torricelli Mts.
- Humata schlechteri* Brause, Bot. Jahrb. 49 (1912) 26. — Lectotype (here chosen): *Schlechter 16493* (iso K, KYO, P, PE), New Guinea, Kaiser Wilhelmsland 'in bergwälder von Kelel'.
- Humata cromwelliana* Rosenst. in Fedde, Repert. 10 (1912) 324. — Type: *Bamler 8* (K, P, UC), New Guinea, Cromwell.
- Humata perpusilla* Alderw., Bull. Jard. Bot. Buitenzorg II, 7 (1912) 17. — Lectotype (here chosen): *Boerlage 346* (BO), Moluccas, Ambon, Mt Toena.
- Humata brooksii* Copel., Philipp. J. Sci., Bot. 7 (1912) 64. — Type: *Brooks 134* (BM), Borneo, Sarawak, Mt Poh.

- Humata puberula* Copel., Philipp. J. Sci., Bot. 7 (1912) 64. — Type: *Brooks 135* (n.v.), Sarawak, Mt Penrisen.
- Humata repens* forma *nana* Alderw., Bull. Jard. Bot. Buitenzorg II, 7 (1912) 17. — Type: *Docters van Leeuwen 15* (n.v.), Java, Trètes.
- Humata tenuis* Copel., Philipp. J. Sci., Bot. 7 (1912) 67. — Type: *King 367* (BM), New Guinea, Tamata.
- Humata dimorpha* Copel., Philipp. J. Sci., Bot. 7 (1912) 68. — Type: *King 326* (n.v.), Papua, Lake Lakekamu.
- Humata subtilis* forma *major* Alderw., Bull. Jard. Bot. Buitenzorg II, 16 (1914) 17. — Type: *Atjéh (exp. Hulstijn) 261* (BO; iso L), Soela, Taliabo.
- Davallia chrysanthemifolia* Hayata, Icon. Pl. Formos. 4, 5 (1915) 265, t. 97. — Type: *Takeo Ito 27* (TI), Taiwan, Mt Arisan, between Mingetzu and Senninbora.
- Humata kinabaluensis* Copel., Philipp. J. Sci. 12C (1917) 48; C. Chr., Gard. Bull. Str. Settl. 4 (1929) 398; Ibid. 7 (1934) 232. — Type: *Topping 1745* (A), Borneo, Sabah, Kinabalu, Paka cave to Lobang.
- Humata pusilloides* Copel., Sarawak Mus. J. 2 (1917) 338 (descr. in key); Alderw., Bull. Jard. Bot. Buitenzorg II, 28 (1918) 26; Copel., Fern Fl. Philipp. (1958) 176. — Type: *Copeland 153* (BM, K, PNH, SING), Mindanao, Cotabato, Mt Matutum.
- Humata ledermannii* Brause, Bot. Jahrb. 56 (1920) 120. — Type: *Ledermann 9432* (iso BM), New Guinea, Sepik.
- Humata kaudernii* var. *variabilis* C. Chr., Svensk Bot. Tidskr. 16 (1922) 96, f. 3. — Type: *Kaudern 78* (BM, BO), Sulawesi, N Bolaang Mongondori Madajag.
- Humata wernerii* Copel., Univ. Calif. Publ. Bot. 12 (1931) 400, pl. 53B. — *Pachypleuria wernerii* Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 232. — Type: *Werner 17a* (UC; photo K), New Guinea, Mt Goh.
- Humata kinabaluensis* var. *subvestita* C. Chr., Gard. Bull. Str. Settl. 7 (1934) 232. — Type: *Holittum 25549* (BM, BO, K, SING), Borneo, Sabah, Kinabalu near Lobang.
- Humata macrostegia* Tagawa, Acta Phytotax. Geobot. 6 (1937) 231. — Type: *Fukuyama 4752, 23-x-1934* (KYO), Taiwan, Prov. Takao, near Hinokiyama along the Naihonrokugoe.
- Humata mecodioides* Copel., Philipp. J. Sci. 73 (1940) 354, t. 8. — Type: *Brass 11691* (A, BM, BO, L), New Guinea, Balim River.
- Humata similis* Copel., Philipp. J. Sci. 73 (1940) 354, t. 9. — Type: *Brass 13365* (A, BM, BO), New Guinea, Idenburg River, Bernhard Camp.
- Humata deltoidea* Copel., Philipp. J. Sci. 73 (1940) 352, t. 6. — Type: *Brass 13382* (A, BM, BO, L), New Guinea, Idenburg River, Bernhard Camp.
- Humata papuana* Copel., Gen. Fil. 24 (1943) 441. — *Pachypleuria papuana* Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 231. — Type: *Brass 6987* (A, BM, L), New Guinea, Palmer River.
- Humata dissecta* Alston, Nova Guinea II, 7 (1956) 2. — *Pachypleuria dissecta* Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 233. — Type: *C. J. Brooks 17571* (BM; iso BO), Moluccas, Ambon, Mt Toena.
- Humata pauxilla* Stone & Lane, Bot. Notis. 112 (1959) 373, f. 1. — Type: *Stone, Gressitt & Alban 2441* (BISH; iso K).
- Humata brackenridgei* Brownlie, Fl. Nouv.-Caléd. 3, Pterid. (1969) 150, t. 17, f. 6, 7. — Type: *Brackenridge* (n.v.).

Rhizome without the scales 0.5–3 mm diam., white waxy under the scales. *Scales* brown or red brown, with pale border from base to apex or not, narrowed evenly towards the apex, not or seldom curling backward, bearing multiseptate hairs at least when young or, with marginal setae at least in distal part, peltate, 2.5–7 by 0.3–1.5 mm. Stipes adaxially grooved, 0.1–18 cm long, glabrous or with few scales. *Lamina* compound (pinnate with pinnatifid to pinnatifid pinnae, or bipinnate to quadripinnate towards base and in the middle part), simple (one pectinate or pinnatifid leaf),

3-foliate (the leaflets more or less divided), or pinnate towards base, ovate, deltoid and broadest towards base, glabrous, 0.6–24 by 0.5–14 cm, strongly dimorphous or not or slightly dimorphous. Longest petiolules 0–4 mm long. Pinnae linear-triangular, narrowly ovate, linear, or ovate to deltoid. Longest pinnae 1–10 by, 0.6–7 cm. Pinnules (if present) of at least the larger pinnae anadromous, linear oblong or narrowly ovate. Longest pinnules 5–55 by 5–20 mm. Ultimate leaflets (if present) lobed almost to the midrib or only shallowly lobed. Ultimate segments or lobes obtuse or acute without a tooth. In dimorphous plants lamina of fertile leaves pinnate with strongly dissected pinnae, bipinnate, or tripinnate towards base and in the middle part. Longest petiolules of fertile leaves 1–7 mm long. Pinnae deltoid, linear-triangular, or narrowly ovate, 1–8 by 0.3–2.5 cm. Pinnules or pinna-lobes deltoid, or linear-oblong, 2–35 by 1.5–15 mm. Ultimate leaflets linear oblong. Ultimate segments of fertile leaves 1–15 by 0.5–2 mm. Leaf axes glabrous. Veins in sterile ultimate lobes simple, forked, or pinnate, reaching the margin. False veins not present. *Sori* separate, borne several on a segment, or in much divided leaves frequently single on a segment, at the forking point of veins. Indusium attached at the broad base and hardly or not at the sides, semicircular or more or less triangular to rhomboid, wider than long, about as wide as long, 0.3–1 by 0.3–1.3 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin. Lamina generally extending into a tooth at both sides or only at the outside of a sorus, or not extending into teeth beyond a sorus.

Legends to Plates 6–9:

Plate 6. Habit of different forms of *Davallia repens* (L. f.) Kuhn. – 1. *Main & Aden 1510*, Moluccas, Morotai, leaves monomorphous, fertile and sterile leaf. – 2. *Brooke 9064*, Sarawak, leaves monomorphous, fertile and sterile leaf. – 3. *Brooke 8143*, Sarawak, leaves monomorphous, fertile and sterile leaf. – 4. *Brass 7166*, Papua New Guinea, Fly River, leaves monomorphous, fertile leaf. – 5. *de Joncheere 1546*, Sulawesi, leaves polymorphous, fertile and sterile leaf. – 6. *Brass 31561*, Papua New Guinea, Eastern Highlands, leaves heteromorphous, fertile and sterile leaf.

Plate 7. Habit of different forms of *Davallia repens* (L. f.) Kuhn. – 7. *Nootboom 5542*, Hainan, leaves monomorphous, fertile and sterile leaf. – 8. *Price & Hernaez 713*, Samar, Philippines, leaves heteromorphous, fertile and sterile leaf. – 9. *Anderson & Paie S 28663*, Sarawak, leaves ± monomorphous, fertile and sterile leaf. – 10. *Ueda & Darnaedi B-11573*, Borneo, East Kalimantan, leaves monomorphous, fertile and sterile leaf. – 11. *Kato c.s. B-3673*, Borneo, East Kalimantan, leaves monomorphous, fertile and sterile leaf.

Plate 8. Habit of different forms of *Davallia repens* (L. f.) Kuhn. – 12. *LAE Stevens 58472*, New Britain, leaves monomorphous, fertile and sterile leaf. – 13. *Schodde 3022*, Papua New Guinea, leaves monomorphous, fertile and sterile leaf. – 14. *Croft 1717*, Papua New Guinea, W Sepik, leaves heteromorphous, fertile and sterile leaf.

Plate 9. Habit of different forms of *Davallia repens* (L. f.) Kuhn. – 15. *Alston 16628*, Moluccas, Ternate, leaves monomorphous, fertile leaf. – 16. *Croft 29*, Papua New Guinea, Star Mountains, leaves monomorphous, fertile leaf. – 17. *Kato c.s. C-1734*, Ceram, leaves monomorphous, fertile leaf.



Plate 6 — For legends, see page 195.

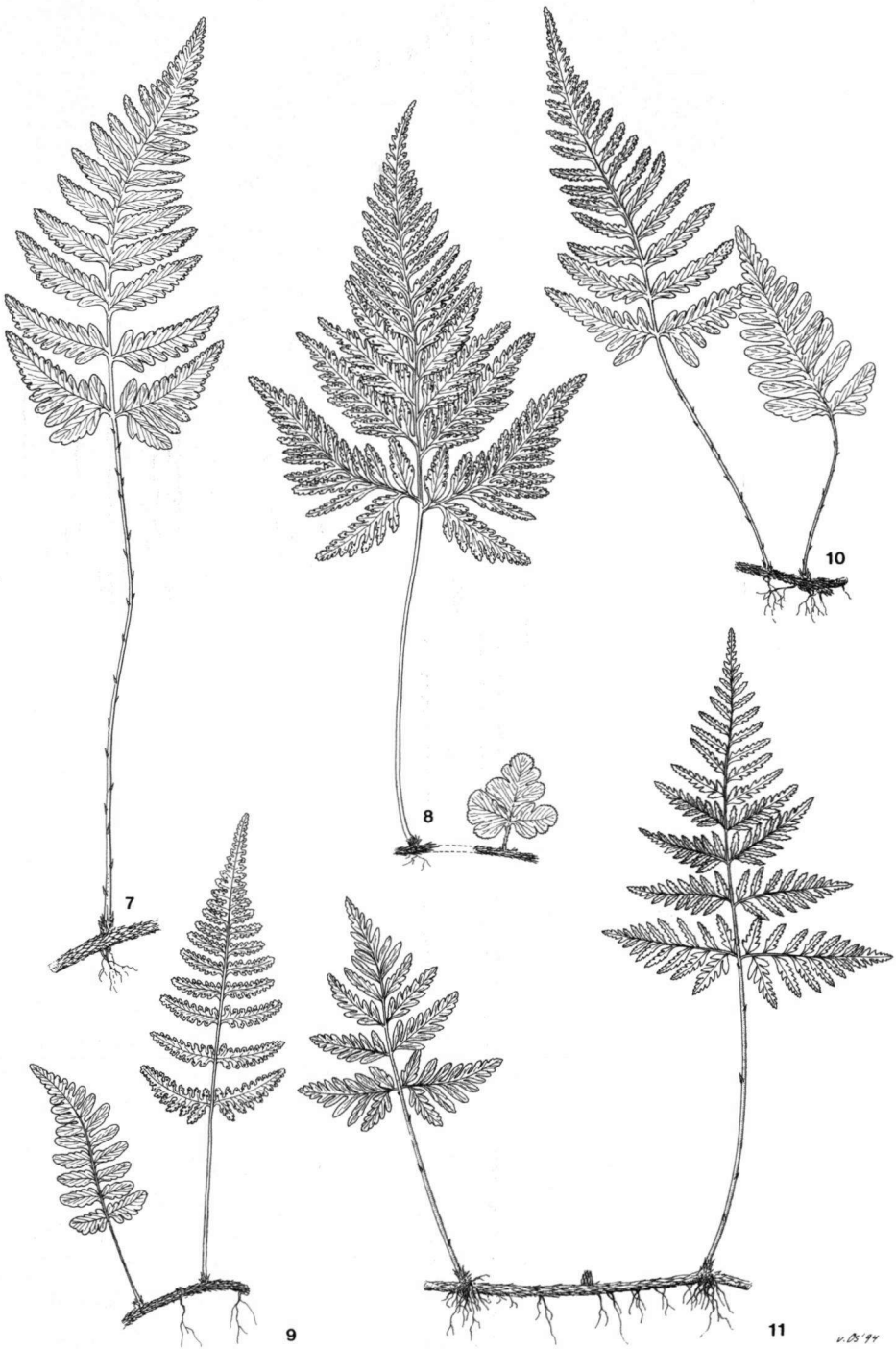


Plate 7 — For legends, see page 195.

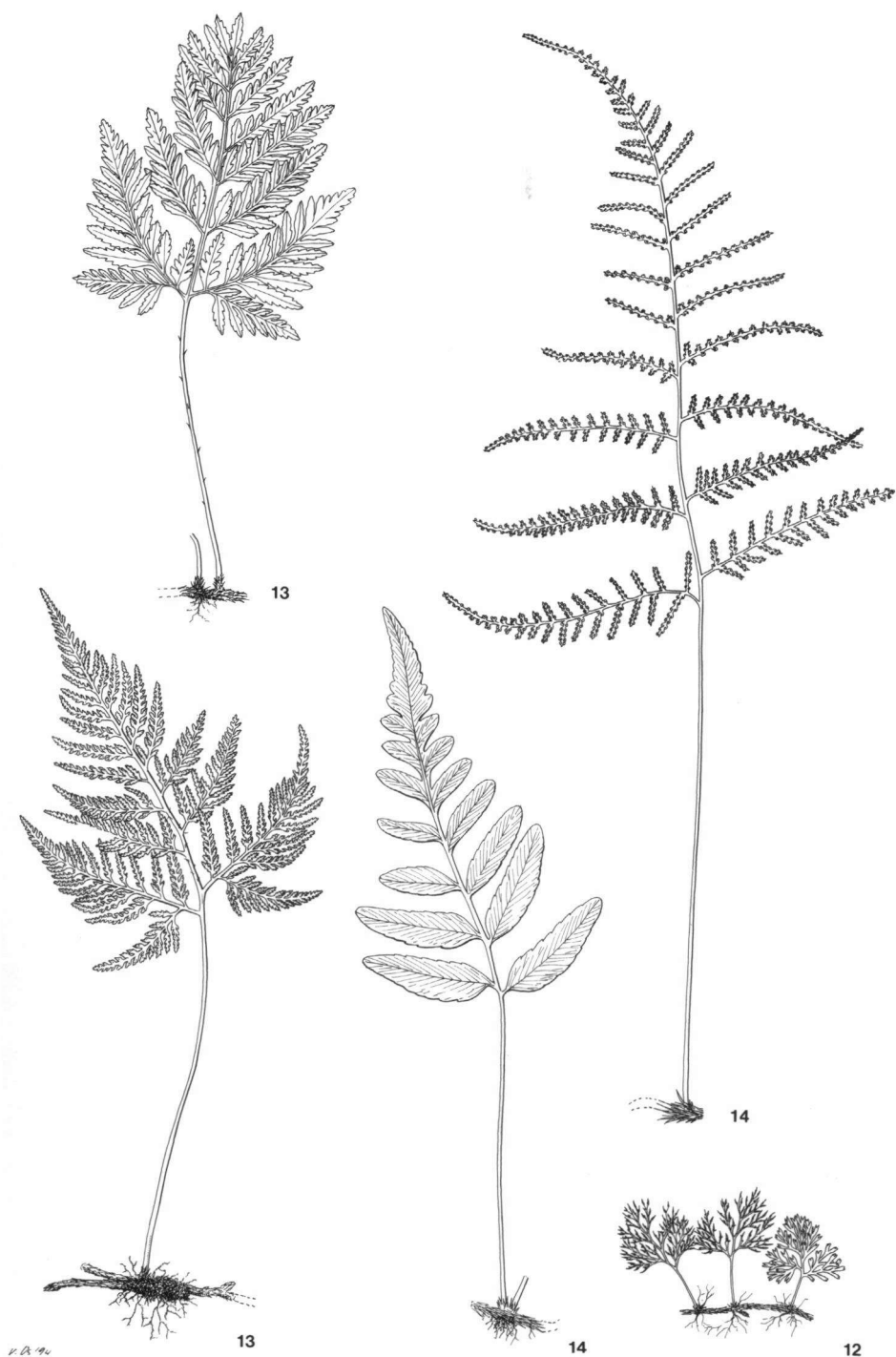


Plate 8 — For legends, see page 195.



Plate 9 — For legends, see page 195.

Distribution – Africa: Cameroun, Gabon; Indian Ocean: Comores and Madagascar (many coll.), Seychelles (3 coll.), Mascareignes, Réunion and Mauritius (many coll.); Kerguelen (Bourbon I., 1 coll.). Continental Asia: Sri Lanka and throughout India (many coll.), Sikkim (2 coll.); S Burma (1 coll.), China (Kiangsi, Szechuan, Kweichow, Fukien, Quangdong incl. Hongkong, Kwangsi, Yunnan, Hainan; many coll.), Taiwan (many coll.); Thailand and Vietnam (many coll.); Cambodia (5 coll.); Japan (Honshu, Shikoku, Kyushu, Yakushima, Okinawa; many coll.). Malesia: throughout, with many collections. Australia: Queensland (many coll.). Pacific: common in the Admiralty Islands, Solomon Islands, New Hebrides, New Caledonia, Fiji, and Samoa.

Habitat & Ecology – Very diverse. Low or high epiphytic, epilithic on various kinds of rocks, sometimes terrestrial. In very wet to dry sunny places; altitude from sea-level up to 3420 m.

Note – This is a very variable species. On the basis of herbarium specimens it is not possible to subdivide it, which results in a very unsatisfying and extremely variable species. The species is probably subject to hybridizing and introduction of genes from several related species. From Sri Lanka an apogamous triploid was described by Manton & Sledge (1954, see literature section). In areas where no related species are found, as in China, the islands in the Indian Ocean, and in Africa, only the pure form with pinnate to pinnatifid leaves occurs. In New Guinea the pure form is very rare. I have tried to subdivide the species into varieties. Although some forms are rather constant even over large areas, there are always many intermediate forms found between all the rather constant ones, making identification impossible. The pure form is generally found at lower altitudes, the other forms higher, for instance in W Java the pure form occurs from 450 to 1100 m, the other forms from 1400 to 2500 m. In the Malay Peninsula this is from 150 to 1600 m and from 1400 to 2000 m, respectively. In Borneo, however, the pure form is found from 0 to 2500 m, the other forms from 100 to 3150 m. In the Philippines they are found from 500 to 1350 m and from 400 to 2500 m, respectively.

23. *Davallia rouffaeriensis* Noot., *spec. nov.*

Rhizoma 1.3–2.8 mm crassa alba ceracea squamis reflexis sine pilis multicellularibus; lamina glabra anguste ovata elongata pinnata 10–22 cm longa, 3–6.5 cm lata, pinnis pinnatilobatis ad pinnatifidis venis falsis absentis soris frequente singulis indusio basi affixo. — Type: *Docters van Leeuwen 10277* (L; iso A, BO), New Guinea, Rouffaer River.

Rhizome without the scales 1.3–2.8 mm diam., white waxy under the scales or not. Scales brown, without pale border, narrowed evenly towards the apex, often curling backward, not bearing multiseptate hairs, lacking marginal setae or teeth or those rare, or toothed, peltate, 4–6 by 0.8–1 mm. Stipes dark brown, adaxially grooved, 3–14 cm long, glabrous or with few scales. Lamina narrowly ovate, elongate, pinnate with pinnatilobed to pinnatifid pinnae towards base and in the middle part, glabrous, 10–22 by 3–6.5 cm, not or slightly dimorphous. Pinnae linear-triangular. Longest pinnae 1.5–3.5 by 0.3–0.7 cm. False veins not present. Sori separate, frequently single on a segment at the forking point of veins. Indusium attached at the broad base and hardly or not at the sides, more or less triangular to rhomboid, about as wide as

long, 0.4–0.6 by 0.4–0.6 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin.

Distribution – Malesia: West New Guinea (Rouffaer River, 2 coll.).

24. *Davallia sessilifolia* Blume

Davallia sessilifolia Blume, Enum. Pl. Javæ (1828) 231; Hook., Sp. Fil. (1845) 154; Kunze, Farnkräuter (1847) 17, t. 107; Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 289; Christ, Verh. Naturf. Ges. Basel 2 (1897) 8; Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 227. — *Pachypleuria sessilifolia* K. Presl, Epim. Bot. (1851) 98. — *Humata sessilifolia* Mett., Fil. Hort. Bot. Lips. (1856) 102. — Type: Kuhl & van Hasselt s.n. (L sh 908.275-915), Java, Salak.

Humata polypodioides Brack., U.S. Expl. Exped., Filic. 16 (1854) 228, t. 32, f. 1; Brownlie, Pterid. Fl. Fiji (1977) 159. — Type: Brackenridge (n.v.), Fiji.

Davallia aemula Mett. in Kuhn, Linnæa 36 (1869) 144; Carruth. in Seem., Fl. Vit. (1873) 335. — Type: Cuming (MacGillivray) 64 (BM, L, P), New Hebrides, Aneityum.

Rhizome without the scales 0.8–1.3 mm diam., white waxy under the scales. *Scales* red brown with pale border from base to apex or not, narrowed evenly towards the apex, often curling backward, not bearing multiseptate hairs, toothed, peltate, 5–8 by 0.5 mm. Stipes pale, adaxially grooved, 0.5–7 cm long, glabrous or with few scales. *Lamina* simple, one pectinate or pinnatifid leaf, or pinnate towards base, ovate, bearing multicellular hairs, or glabrous, 2–16 by 1.8–5 cm, not or slightly dimorphous. False veins not present. Veins in ultimate lobes pinnate. *Sori* separate, borne several on a segment at the forking point of veins. Indusium attached at the broad base and hardly or not at the sides, semicircular, wider than long or about as wide as long, 1.1–1.8 by 1.2–1.8 mm broad, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin.

Distribution – Malesia: Sumatra (Kerinci, 2 coll.), Java (many coll.), Lesser Sunda Islands (Bali, Lombok, Flores; 6 coll.); Borneo: Kalimantan Timor (Berau, 1 coll.); Philippines (Luzon, 1 coll.), Sulawesi (central, Sopo Valley, 4 coll., north, 6 coll.), Moluccas (Ternate, 2 coll.), New Guinea (many coll.). Pacific: Solomons (2 coll.), New Hebrides (7 coll.), Fiji (7 coll.).

Habitat & Ecology – Epiphytic from deep shade to full sun; altitude 150–1770 m.

25. *Davallia sessilifolioides* Kato

Davallia sessilifolioides Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 227. — Type: Kato c.s. C-5336 (TI; iso BO, L), Moluccas, Ceram.

Rhizome without the scales 0.8–1.3 mm diam., white waxy under the scales. *Scales* red brown, without pale border, narrowed evenly towards the apex, often curling backward, not bearing multiseptate hairs, toothed, peltate, 5–8 by 0.5 mm. Stipes pale or dark brown, adaxially grooved, 0.5–4.5 cm long, glabrous or with few scales. *Lamina* ovate, pinnate with pinnatilobed to pinnatifid pinnae towards base and in the middle part, deltoid and broadest towards base, glabrous, 4–7 by 1.7–2.5 cm, not or slightly dimorphous. Pinnae linear. Longest pinnae 0.8–1.5 by 0.3–0.8 cm. Ultimate leaflets lobed almost to or halfway towards midrib, veins in ultimate lobes of sterile leaves single or forked. False veins not present. *Sori* separate, usually borne

single on a segment at the forking point of veins. Indusium attached at the broad base and hardly or not at the sides, ovate or semicircular, longer than wide, or about as wide as long, 1–1.2 by 0.8–1 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin.

Distribution – Malesia: Moluccas (Ceram, Manusela Nat. Park, 4 coll.).

Habitat & Ecology – Altitude 200–1000 m.

Note – This species is closely related to *D. sessilifolia*, mainly differing in the more dissected leaves.

26. *Davallia solida* (Forst.) Sw.

a. var. *solida*

Davallia solida Sw., J. Bot. (Schrader) 1800 (1801) 87; Syn. Fil. (1806) 132, 345, p.p.; J. Sm., J. Bot. 3 (1841) 417; Hook., Sp. Fil. (1845) 163; Bedd., Ferns Brit. India (1865) t. 104; Hook., Syn. Fil. (1868) 95; Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286; Bedd., Handb. Ferns Brit. India (1883) 59; Christ, Verh. Naturf. Ges. Basel 2 (1897) 7; Bull. Herb. Boissier 6 (1898) 142; Copel., Publ. Bur. Sci. Gov. Lab. Philipp. 28 (1905) 53; Fern Fl. Philipp. (1958) 173; Holttum, Revis. Fl. Malaya 2, sec. ed. (1966) 360; Hoshiz., Bailey 21 (1981) 30, t. 17, 18; Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 226. — *Trichomanes solidum* Forst., Fl. Ins. Austr. (1786) 86. — *Humata solida* Desv., Prod. Fam. Foug. (1827) 324. — *Stenolobus solidus* K. Presl, Tent. Pterid. (1836) 130. — Type: *Forster 308* (BM; iso P), Pacific Islands.

Davallia caudata Cav., Descr. Pl. (1802) 279; Willd., Spec. Pl. 5 (1810) 472; Desv., Prod. Fam. Foug. (1827) 315; Spreng., Syst. Veg. 4 (1827) 119; Wall., Cat. (1830) nr. 2220. — *Parestia caudata* K. Presl, Epim. Bot. (1851) 100. — Type: *Née* (n.v.), Philippines.

Davallia procera Hedw., Fil. Gen. Sp. (1803) t. 24, acc. to Index Filicum.

Davallia magellanica Desv., Berl. Mag. 5 (1811) 328. — Type: *Commerson Herb. de Jussieu* (P). *Nephrodium lucidulum* K. Presl, Reliq. Haenk. 1 (1825) 39. — Type: *Haenke 39* (PR).

Davallia splendens Blume, Enum. Pl. Javae (1828) 234. — Type: *Reinwardt* (L sh 908.332-920), Banda.

Stenolobus kunzeanus K. Presl, Tent. Pterid. (1836) 130, t. 4, f. 30. — Type: *Kunze* (n.v.), Vanikoro.

Stenolobus ornatus K. Presl, Tent. Pterid. (1836) 130. — [*Davallia ornata* Wall., Cat. (1829) nr. 246, nomen.] — *Davallia solida* var. *latifolia* Hook., Sp. Fil. (1846) 163. — *Davallia solida* var. *ornata* Mett. ex Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 286. — Type: *Wallich 246* (K; iso P), Malay Peninsula, Penang.

Davallia lindley Hook., Sp. Fil. (1845) 163. — Type: *Lindley* (K), Fiji.

Davallia solida var. *caudata* Hook., Sp. Fil. (1846) 163. — Type: *Wallich 2220*.

Davallia tahitiensis Brack., U.S. Expl. Exped., Filic. 16 (1854) 245. — Type: *Brackenridge* (n.v.), Tahiti.

Davallia arctotheca Fourn., Ann. Sci. Nat. Bot. V, 18 (1873) 339. — Type: *Balansa 852* (P), New Caledonia, Bourail.

Davallia plumosa Baker, J. Bot. n.s. 5 (1876) 10. — Type: *Whitmee 217* (BM, K), Pacific, Samoa.

Davallia solida var. *sinensis* Christ, Bull. Herb. Boissier 7 (1899) 18. — *Davallia sinensis* Ching, Bull. Fan Mem. Inst. Biol. 2 (1931) 202, t. 16. — Type: *Henry 11822* (K, P), China, Yunnan, Mengtze.

Davallia solida forma *tomentella* Rosenst. in Fedde, Repert. 13 (1914) 213. — Type: *Grasshoff 43* (n.v.).

Davallia elmeri Copel., Leaf. Philipp. Bot. 9 (1920) 3107; Fern Fl. Philipp. (1958) 174. — Type: *Elmer 16234* (A, BM, BO), Luzon, Sorsogon Prov., Irosin, Mt Bulusan.

Davallia robinsonii Copel., Philipp. J. Sci. 30 (1926) 326; Fern Fl. Philipp. (1958) 173. — Type: *BS 11704* (Robinson) (P), Mindanao, Cota Bato.

Davallia subsolida Ching, Fl. Reip. Pop. Sin. 2 (1959) 376. — Type: *Kudo & Susuki 15996* (PE), Taiwan.

Davallia solida cv 'Ruffled Ornata' Hoshiz., Bailey 21 (1981) 32, t. 19. — Type: *Hoshizaki* (n.v.).

Rhizome without the scales 4–14 mm diam., generally not white waxy. Scales red brown or nearly black (the peltate base black, persistent when the rest of the scales is shed) with pale border from base to apex, narrowed evenly towards the apex or above the much broader base evenly narrowed towards apex, not or seldom curling backward, bearing multiseptate hairs at least when young (hairs at least at apex of young scales, c. 1 mm long, woolly), peltate, 5–10 by 1–1.2 mm. Stipes pale, adaxially grooved, 9–35 cm long, glabrous or with few scales. Lamina compound, bipinnate or tripinnate towards base and in the middle part, deltoid and broadest towards base, glabrous (sometimes with hairs on junction of rhachis and petiolule), 15–90 by 21–40 cm, not or slightly dimorphous. Longest petiolules 5–25 mm long. Pinnae linear-triangular or narrowly ovate. Longest pinnae 11–28 by 6–15 cm. Pinnules of at least the larger pinnae anadromous, deltoid or rhomboid. Longest pinnules 40–100 by 15–80 mm. Ultimate leaflets linear oblong or rhomboid, lobed almost to the midrib, or only shallowly lobed (in bipinnate leaves the ultimate segments shallowly lobed). Ultimate segments 10–40 by 3–17 mm. Upper ridge at the junction of the costa and pinna-rhachis not swollen. Leaf axes glabrous (often hairs at junction of petiolules). Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes pinnate, reaching the margin or not. False veins not present. Sori separate, borne several on a segment at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide, 1.2–2 by 0.5–1 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin. Lamina not extending into teeth beyond a sorus.

Distribution – Continental Asia: Sri Lanka (2 coll.), India, Assam (Khasia, 1 coll.), Andaman & Nicobar Islands (5 coll.), Burma (3 coll.), Thailand (many coll.), Cambodia (4 coll.), Vietnam (Tonkin, 3 coll.), Cochinchina (2 coll.), China (Yunnan, Kwangsi; 7 coll.), Taiwan (many coll.); Malesia: Sumatra and Malay Peninsula (many coll.), Anambas & Natuna Is. (2 coll.); Java (many coll.), Lesser Sunda Islands (Sumba, Flores; 3 coll.); Borneo: Sarawak (5 coll.), Brunei (1 coll.), Sabah (5 coll.), Kalimantan Selatan (2 coll.), Kalimantan Tengah (1 coll.), Kalimantan Timur (9 coll.); Philippines and Moluccas throughout common; W New Guinea (8 coll.), Papua New Guinea (many coll.); Pacific: common from Bismarck Archipelago to Santa Cruz, Samoa and Society Islands, New Hebrides, New Caledonia, Fiji, and Tonga.

Habitat & Ecology – Epiphytic, epilithic on different kinds of rock, or terrestrial on different kinds of soil; as well in exposed places as in deep shadow, from open rocky places and savannas to primary rain forest; altitude 0–1500 m.

Note – Sometimes the leaf segments are very narrow and then the plant resembles var. *fejeensis*.

b. var. *pyxidata* (Cav.) Noot., stat. nov.

Davallia pyxidata Cav., Descr. Pl. (1802) 278; Kaulf., Enum. Filic. (1824) 221; Hook., Gen. Fil. (1842) t. 28; Hoshiz., Bailey 21 (1981) 30, t. 16. — *Humata pyxidata* Desv., Prod. Fam. Foug. (1827) 325. — Type: *Née* (n.v.).

Rhizome without the scales 3–12 mm diam., white waxy under the scales. *Scales* red brown (black peltate base falling together with rest of scale), 5–8 by 1 mm. Stipes 5–20 cm long. *Lamina* compound, tripinnate towards base and in the middle part, 15–30 by 14–25 cm. Longest petiolules 3–10 mm long. Pinnae deltoid. Longest pinnae 6–17 by 3.5–9 cm. Pinnules deltoid or narrowly ovate, longest 27–70 by 12–40 mm. Ultimate leaflets linear oblong or narrowly ovate, lobed almost to the midrib or only shallowly lobed. Ultimate segments 5–20 by 3–8 mm. Indusium 1–1.5 by 0.6–1 mm.

Distribution – Australia: Queensland, rather common; New South Wales, common.

Habitat & Ecology – Epilytic on various kinds of rock, often in cracks and crevices or epiphytic in dry sclerophyll forest to wet Eucalypt or rain forest.

c. var. *fejeensis* (Hook.) Noot., stat. nov.

Davallia fejeensis Hook., Sp. Fil. (1845) 166, t. 55D; Diels in Engl. & Prantl, Nat. Pflanzenfam. 1, 4 (1899) 214; Hoshiz., Bailey 21 (1981) 14, t. 7, 8; N.C. Nair et al., J. Econ. Bot. 3, 1982 (1983) 783–785. — *Stenolobus fejeensis* K. Presl, Epim. Bot. (1851) 99. — Type: *Barclay* (n.v.), Fiji.

Davallia fejeensis cv 'Plumosa' Hoshiz., Bailey 21 (1981) 23, t. 12. — Type: *Hoshizaki* (n.v.).

Davallia fejeensis cv 'False Plumosa' Hoshiz., Bailey 21 (1981) 23, t. 10. — Type: *Hoshizaki* 77-74 (n.v.).

Davallia fejeensis cv 'Major' Hoshiz., Bailey 21 (1981) 23, t. 11. — Type: *Hoshizaki* 79-7 (n.v.).

Davallia fejeensis cv 'Dwarf Ripple' Hoshiz., Bailey 21 (1981) 19, t. 9. — Type: *Hoshizaki* 79-8 (n.v.).

Rhizome white waxy or not. *Lamina* compound, quadripinnate (to 5-pinnate) towards base and in the middle part. Longest pinnae 11–30 by 6–30 cm. Pinnules narrowly ovate (to narrowly deltoid). Ultimate leaflets narrowly ovate, lobed almost to the midrib. Ultimate segments or lobes obtuse or acute without a tooth, 3–5 by 0.2–1 mm. Veins in sterile ultimate lobes frequently simple, not reaching the margin. *Sori* separate, frequently single on a segment.

Distribution – Pacific: Fiji, common; Austral Islands (Rapa, 2 coll.).

Habitat & Ecology – Epiphytic and epilithic; altitude 0–900 m.

27. *Davallia speciosa* Mett. in Kuhn

Davallia speciosa Mett. in Kuhn, Linnaea 36 (1869) 145; Bedd., Handb. Ferns Brit. India (1883) 61. — Type: *Parish* 32 (K), Burma, Moulmein.

Rhizome without the scales 3–5 mm diam., not white waxy. *Scales* red brown, without pale border, flat and nearly acicular, narrowed abruptly from a broad base, often curling backward, not bearing multiseptate hairs, lacking marginal setae or teeth or those rare, peltate, 5–7 by 0.8–1.5 mm. Stipes dark brown, adaxially grooved, 7–13 cm long, glabrous or with few scales. *Lamina* compound, deltoid, bipinnate towards base and in the middle part, deltoid and broadest towards base, glabrous, 16–

25 by 12–18 cm, not or slightly dimorphous. Longest petiolules 3–8 mm long. Pinnae deltoid or ovate. Longest pinnae 6–10 by 3.5–5 cm. Pinnules of at least the larger pinnae anadromous, ovate, pinnules 15–30 by 8–12 mm. Ultimate leaflets lobed almost to the midrib. Ultimate segments or lobes obtuse or acute without a tooth, 4–6 by 2–4 mm. Upper ridge at the junction of the costa and pinna-rhachis not swollen. Leaf axes glabrous. Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes pinnate, reaching the margin. False veins not present. *Sori* separate, borne several on a segment, at the forking point of veins. Indusium attached at the base and only part of the sides, more or less triangular to rhomboid, about as wide as long, 0.8–1.2 by 0.8–1.2 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin. Lamina generally extending into a tooth only at the outside of a sorus.

Distribution – Continental Asia: Burma (Moulmein, 2 coll.).

28. *Davallia tasmani* Field

Davallia tasmani Field, Ferns New Zealand (1890) 75, t. 24-5; Cheeseman, Ferns of New Zealand (1890) 75, t. 24 n. 5; Brownsey, Nat. Mus. N. Z. Records 1 (1979) 252; Hoshiz., Bailey 21 (1981) 26, t. 20; Brownsey, New Zealand J. Bot. 23 (1985) 435, 443. — Type: Cheeseman (K), New Zealand, North Island, Three Kings Island.

Rhizome without the scales 4.5–8 mm diam., not white waxy. *Scales* brown or red brown, with pale border from base to apex, narrowed evenly towards the apex, curling backward or not, bearing multiseptate hairs at least when young, peltate, 5–7 by 1–2 mm. Stipes adaxially grooved, 7–16 cm long, glabrous or with few scales. *Lamina* compound, rhomboid, tripinnate or quadripinnate towards base, broadest towards base, glabrous, 9–15 by 10–16 cm, not or slightly dimorphous. Longest petiolules 3–10 mm long. Pinnae rhomboid, longest 5–10 by 3.5–8 cm. Pinnules of at least the larger pinnae anadromous, ovate. Longest pinnules 30–60 by 15–35 mm. Ultimate leaflets lobed almost to the midrib. Ultimate segments or lobes obtuse or acute without a tooth, 2–6 by 1.5–2 mm. Upper ridge at the junction of the costa and pinna-rhachis with a swollen lip or not. Margins of the lamina of each leaflet thickened and decurrent on the edge of the grooved rhachis. Veins in sterile ultimate lobes pinnate, reaching the margin or not. False veins not present. *Sori* separate, frequently single on a segment at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide, 1.7–2 by 1 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin. Lamina generally extending into a tooth at both sides of a sorus, or not extending into teeth beyond a sorus.

Distribution – New Zealand: North Island, Three Kings Island. According to Brownsey (1985) also found in Puketi Forest, Northland. However, the latter seems to be another species, maybe introduced, of yet unknown status (pers. comm. by Dr. John E. Braggins).

Note – The present species resembles very much *Davallia canariensis*. As a matter of fact, the only constant difference is the rhizome not being white waxy. Further research is needed to know whether this is derived from an early introduction.

29. Davallia trichomanoides Blume**a. var. trichomanoides**

- Davallia trichomanoides* Blume, Enum. Pl. Javae (1828) 238; Hook., Sec. Cent. Ferns (1861) t. 64; Backer & Posthumus, Varenfl. Java (1939) 100, f. 18; Copel., Fern Fl. Philipp. (1958) 172; Holttum, Revis. Fl. Malaya 2, sec. ed. (1966) 361; Hoshiz., Bailey 21 (1981) 36, t. 21; Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 229. — Type: *Blume* (L sh 908.332-946), Java.
- Davallia bullata* Wall. [Cat. (1829) nr. 258, nomen] ex Hook., Sp. Fil. (1845) 169, t. 50B; Bedd., Ferns S. India (1863) t. 17; Hook., Syn. Fil. (1868) 97; Clarke, Rev. Ferns N. India (1880) 445; Bedd., Handb. Ferns Brit. India (1883) 61; Copel., Publ. Bur. Sci. Gov. Lab. Philipp. 28 (1905) 54; Hayata, Bot. Mag. (Tokyo) 23 (1909) 26; Hoshiz., Bailey 21 (1981) 5, t. 1. — Type: *Wallich* 258 (K; iso P), Nepal.
- Davallia stenomera* Kunze, Bot. Zeitung (Berlin) 1848 (1848) 216. — Type: *Zollinger* 359 (L).
- Davallia dissecta* T. Moore & Houlst., Gard. Mag. Bot. 3 (1851) 325. — Type: ?, introduced in 1849 by Messrs. Rollisson of Tooting.
- Davallia decora* T. Moore in Sim, Cat. Br. & Exot. Ferns (1859) 39. — Type: unknown.
- Davallia mariesii* T. Moore ex Baker, Ann. Bot. (London) 5 (1891) 201; Hoshiz., Bailey 21 (1981) 25, t. 14. — Type: *Maries in Hort. Veitch 1818* (Moore herb. in K).
- Davallia fructuosa* Christ in Warb., Monsunia 1 (1900) 86. — Type: *Warburg s. n.*, Java.
- Davallia barbata* Alderw. Bull. Jard. Bot. Buitenzorg II, 11 (1911) 7. — *Davallia subdissecta* Alderw., Bull. Jard. Bot. Buitenzorg II, 23 (1916) 11. — *Davallia trichomanoides* forma *barbata* Backer & Posthumus, Varenfl. Java (1939) 101; Hoshiz., Bailey 21 (1981) 38, t. 22. — Type: *Hallier* 671 (BO; iso P), Java, Tjibodas-Tjibeurum.
- Davallia koordersii* Alderw., Bull. Jard. Bot. Buitenzorg II, 11 (1911) 5. — Lectotype (here chosen): *Koorders 19387* (BO; iso L), Java, Besoeki, Idjen.
- Davallia stenolepis* Hayata, Icon. Pl. Formos. 4 (1914) 204, t. 138. — *Davallia mariesii* var. *stenolepis* Hoshiz., Bailey 21 (1981) 27, t. 15. — Type: *Mori 2359* (TI), Formosa, Taito, Daironkosha.
- Davallia subdissecta* var. *elegantior* Alderw., Bull. Jard. Bot. Buitenzorg II, 28 (1918) 17. — Type: *Backer 23827* (BO), Java, G. Sanggaboewana.
- Davallia subdissecta* var. *subgenuina* Alderw., Bull. Jard. Bot. Buitenzorg III, 2 (1920) 140. — Type: *Lörzing 5925* (BO; iso K, L), Sumatra, Karo Plateau, Berastagi.
- Davallia petelotii* Tard.-Blot & C. Chr., Notul. Syst. (Paris) 6 (1937) 4, t. 1 (5-7). — Type: *Péte-lot 4200* (P; iso BM), Indo-China, Tonkin, Plaine de Jarres.
- Trogostolon yunnanensis* Ching, Fl. Reip. Pop. Sin. 2 (1959) 374. — Type: *R.N. 8612* (PE), Yunnan, Ping-chuan, Chi-tso Shan.
- Davallia cylindrica* Ching, Fl. Reip. Pop. Sin. 2 (1959) 375. — Type: *C.W. Wang 74303* (PE; iso IBSC), Yunnan, Foo-hai.
- Davallia elegans* cv *dissecta* Hort., Bailey 21 (1981) 36. — *Davallia bullata-mariesii* Hort., Hoshiz., nom. syn., Bailey 21, Hort. (1981) 27; *Mori 2359, 2408, Hayata & Sasaki*, Jan. 1912.

Rhizome without the scales 3–8 mm diam., not white waxy. Scales brown or red brown, with pale border from base to apex or not, flat and nearly acicular, narrowed abruptly from a broad base or above the much broader base evenly narrowed towards apex, often curling backward or appressed to rhizome, usually crisped, margins recurved, not bearing multiseptate hairs, with marginal setae at least in distal part or toothed, peltate, 4–8 by 1–1.5 mm. Stipes pale, adaxially grooved, 4.5–20 cm long, glabrous or with few scales. Lamina compound, tripinnate or quadripinnate towards base and in the middle part, deltoid and broadest towards base, glabrous, 10–35 by 9–25 cm, not or slightly dimorphous. Longest petiolules 1–6 mm long. Pinnae deltoid, longest 5–19 by 3–12 cm. Pinnules of at least the larger pinnae ana-

dromous, narrowly ovate, longest 20–70 by 10–30 mm. Ultimate leaflets linear oblong or narrowly ovate, lobed almost to the midrib. Ultimate segments 5–27 by 2–6 mm. Upper ridge at the junction of the costa and pinna-rhachis not swollen. Leaf axes glabrous. Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes simple or forked, not reaching the margin. False veins present, rarely absent. *Sori* separate, frequently single on a segment at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide, 1.2–2 by 0.5–1 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin. Lamina generally extending into a tooth at both sides of a sorus or only at the outside of a sorus.

Distribution – Continental Asia: India (Kerala, 2 coll., Darjeeling, 2, Assam and eastern Himalayas, many), Nepal (3 coll.), Sikkim (4 coll.), Burma (2 coll.), N & Central Thailand (7 coll.), China (Shantung, Kiangsu, Fukien, Yunnan; many coll.), Taiwan (many coll.), Korea (7 coll.); Japan, common from Ryu Kyu in the south to Honshu in the north; Vietnam (Annam, Lang Bian, Tonkin; 3 coll.); Malesia: in Sumatra, Malay Peninsula, Java, and Lesser Sunda Islands common; Sulawesi (10 coll.), Moluccas (Buru, 1 coll., Ceram, 3), New Guinea, common.

Habitat & Ecology – Epiphytic and epilithic on different kinds of rock, mostly in wet places, sometimes on dry, exposed, places; altitude 100–3500 m.

Note – According to Hoshizaki (pers. comm.) several of the species treated here as synonyms behave as good species in culture. And, as I have seen in our botanical garden in L, they do indeed. However, after studying over 400 different collections of the entire area I could not but conclude that they all belong to one species. That does not exclude, of course, that different forms from different localities intergrade in nature but behave differently in culture. It would be best to give these forms cultivar names ('*mariesii*' and '*stenolepis*'). Formally naming them according to the rules of nomenclature means that quite a lot of collections cannot be named. As the spores of all the forms are also extremely similar I have no doubt as to their conspecificity.

b. var. *lorrainii* (Hance) Holttum

Davallia trichomanoides var. *lorrainii* Holttum, Revis. Fl. Malaya 2, sec. ed. (1966) 361; Hoshiz., Bailey 21 (1981) 38, t. 23. — *Davallia lorrainii* Hance, Ann. Sci. Nat. Bot. V, 5 (1866) 254; Hook., Syn. Fil. (1868) 469; Bedd., Ferns Brit. India, Suppl. (1876) 4, t. 351; Handb. Ferns Brit. India (1883) 61; C. Chr. & Holttum, Gard. Bull. Str. Settl. 7 (1934) 133. — Type: *Lorrain 1732* (BM), Malaya, Penang.

Scales nearly black with highly contrasting white setae, 4–8 by 1.2–2 mm. Indusium 1–1.5 by 1 mm.

Distribution – Continental Asia: India (Kerala, 2 coll.), Sikkim (1 coll.), Thailand (many coll.), Cambodia (3 coll.), Vietnam (Annam, 6 coll., Cochinchina, 1); Malesia: Sumatra (Acéh 1 coll., W Coast 1, E Coast 3), Malay Peninsula (Kedah, Penang, Selangor, Negri Sembilan; 8 coll.), Java ? (1 coll.); Borneo: Sabah (1 coll.), Kalimantan Timor (4 coll.); Philippines (Luzon, Bohol, Uma, Mindanao; many coll.); Sulawesi (Central, Soroako, 5 coll.),

Habitat & Ecology – Epiphytic or epilithic, most in wet places but sometimes in exposed, dry places and savanna; altitude 100–1800 m.

Note – According to Hoshizaki (pers. comm.) this variety is very distinct in cultivation and could be a good species. From herbarium material, however, the varietal status is more satisfactory. It may be possible that the cultivated plants are derived from one or few extreme forms.

30. *Davallia wagneriana* Copel.

Davallia wagneriana Copel., Publ. Bur. Sci. Gov. Lab. Philipp. 28 (1905) 54; Perkins, Fragm. Fl. Philipp. (1905) 180; Fern Fl. Philipp. (1958) 172; Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 226. — Type: *Copeland 1300* (P), Mindanao, Toddaya dist., Davao.

Rhizome without the scales 2–6 mm diam., white waxy under the scales. *Scales* brown, red brown, or nearly black, without pale border, narrowed evenly towards the apex, not or seldom curling backward, bearing (woolly) multiseptate hairs at least when young, peltate, 6–8 by 1.5–2 mm. Stipes dark brown, adaxially grooved, 8–26 cm long, glabrous or with few scales. *Lamina* compound, bipinnate or pinnate with pinnatifid pinnae towards base and in the middle part, deltoid and broadest towards base or elongate, glabrous, 10–44 by 5–20 cm, not or slightly dimorphous (but pinnulae of fertile leaves very narrow). Longest petiolules 1–4 mm long. Pinnae linear-triangular (curved upwards). Longest pinnae 4–13 by 1.5–3 cm. Pinnules of at least the larger pinnae anadromous. Pinnules or pinna-lobes linear oblong. Longest pinnules 10–15 by 2–3 mm. Ultimate leaflets linear oblong, only shallowly lobed. Upper ridge at the junction of the costa and pinna-rhachis not swollen. Leaf axes glabrous. Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes pinnate, reaching the margin. False veins present or not. *Sori* separate, borne several on a segment at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide or about as wide as long, 1 by 0.5–1 mm. Indusium upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin. Lamina generally extending into a tooth only at the outside of a sorus.

Distribution – Malesia: Sumatra (G. Kiermatuba, 1 coll.), Borneo: Sarawak (G. Mulu, 1 coll.), Kalimantan Timor (3 coll.); Philippines (Luzon, Panay, Mindanao, Negros, Leyte; c. 10 coll.); N Sulawesi (4 coll.), Moluccas (Ceram, 4 coll.).

Habitat & Ecology – Epiphyte in deep shadow (scarcely recorded); altitude 450–1600 m.

Section *Scyphularia* (Fée) Noot., *sect. nov.*

Scyphularia Fée, Gen. Fil. (1852) 324, t. 26B, f. 1; Copel., Philipp. J. Sci. 34 (1927) 254; Ibid. 73 (1940) 356; Brownlie, Pterid. Fl. Fiji (1977) 166; Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 13 (1985) 567; Copel., Gen. Fil. (1947) 88. — Type species: *Scyphularia pentaphylla* Fée.

Parasorus Alderw., Bull. Jard. Bot. Buitenzorg III, 4 (1922) 317, t. 14; Copel., Gen. Fil. (1947) 89; Kato J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 13 (1985) 568. — Type species: *Parasorus undulatus* Alderw.

This section is characterized by a combination of characters not occurring in the type section. The rhizome scales are acicular, the leaves simple or imparipinnate (leaves or leaflets about linear), and the indusia are pouch-shaped, or (in *D. undulata*) connate into a coenosorus.

31. *Davallia pentaphylla* Blume

Davallia pentaphylla Blume, Enum. Pl. Javae (1828) 232; Christ, Verh. Naturf. Ges. Basel 2 (1897) 7; Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 225. — *Stenolobus pentaphyllus* K. Presl, Epim. Bot. (1851) 99. — *Scyphularia pentaphylla* Fée, Mém. Foug. 5, Gen. Fil. (1852) 325, t. 26B, f. 1; Copel., Philipp. J. Sci. 34 (1927) 254; Hoshiz., Baileya 21 (1981) 50, t. 5A, B. — Type: *Blume s. n.* (L, sh 908.332-859; iso K), Java, Bantam.

Humata pinnata Desv. (non *Davallia pinnata* Cav. 1802), Prod. Fam. Foug. (1827) 324, t. 8, f. 1. — *Davallia pinnata* Goldmann in Meyen, Nov. Act. Acad. Caes. Leop. Nat. Cur. Suppl. 1, 19 (1843) 465; Mett. ex Kuhn, Ann. Mus. Bot. Lugd.-Bat. 4 (1869) 288. — Type: Desvaux t. 8, f. 1.

Davallia pycnocarpa Brack., U.S. Expl. Exped. Filic. 16 (1854) 242, t. 35, f. 2. — *Scyphularia pycnocarpa* Copel., Philipp. J. Sci. 34 (1927) 255. — Type: *Brackenridge* (US, n.v.), Fiji, Muthuata Mountains.

Davallia pentaphylla var. *incisa* Rosenst., Hedwigia 56 (1915) 351. — Type: *Bamler 105* (P), Papua New Guinea, Wareo.

Scyphularia sinusora Copel., Philipp. J. Sci. 34 (1927) 255, t. 5. — Type: *Copland King 183* (n.v.), Papua, Goodenough Bay, 1200 m.

Scyphularia tannensis Copel., Univ. Calif. Publ. Bot. 12 (1931) 401. — Type: *Kajewski 102* (K), New Hebrides, Tanna, Lenakel, 200 m.

Scyphularia dorsalis Copel., Univ. Calif. Publ. Bot. 12 (1931) 401. — Type: *Bamler 34* (UC, photo in K), New Guinea, Sattelberg.

Scyphularia appressa Copel., Philipp. J. Sci. 60 (1936) 111, t. 20. — Type: *Brass 2872* (n.v.), San Christoval, Hinuahaoro, 900 m.

Rhizome without the scales 2–4 mm diam., not white waxy. *Scales* nearly black with pale border quickly diminishing or disappearing towards the apex, distinctly acicular, often curling backward, bearing multiseptate hairs at least when young, peltate, 6–10 mm long. Stipes dark brown, adaxially grooved, 2–17 cm long, glabrous or with few scales. *Lamina* imparipinnate, leaflets entire or nearly so, occasionally lobed at the base or once branched (pairs of leaflets 2, occasionally 3–4), glabrous, not or slightly dimorphous. Leaflets entire or nearly so, sometimes with some basal lobes. Sterile terminal leaflet 2.5–16 cm by 13–25 mm. Lateral leaflets 2.5–12 cm by 8–25 mm. Margin flat or nearly so, distinctly crenulate to dentate at least towards apex. Petiolules 0–4 mm long. Leaflets of fertile leaves entire or nearly so, sometimes with some basal lobes. Fertile terminal leaflet 8–19 cm by 7–15 mm. Lateral leaflets 4–14 by 0.4–1.2 cm. Margins distinctly crenulate to dentate at least towards apex. Longest petiolules of fertile leaves 0–4 mm long. Pinnae narrowly ovate or linear (narrowly). Leaf axes glabrous. Margins of the lamina of each leaflet not thickened. Veins in sterile ultimate lobes parallel, once or twice branched from the base, reaching the margin. False veins not present. *Sori* separate (sometimes nearly connate, in a band along the margin) at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide, 1.5–2.5 by 0.75–2 mm, upper margin not elongated, truncate or slightly rounded, separated from to even with lamina margin.

Distribution — Malesia: Sumatra (G. Kerinci, Bengkulu, Bangka, 5 coll.), Java throughout (many coll.), Lesser Sunda Islands (Bali and Flores many coll., Sumbawa 2); Borneo: Sarawak (Lambir 1 coll.), Kalimantan Selatan (G. Besar 1 coll.), Kalimantan Timur (G. Beratus 1 coll., G. Medadam 1 coll.); Sulawesi (20 coll.), Moluccas (Ternate 3 coll., Ceram 6 coll.), New Guinea (many coll.). Pacific: Bougainville (1 coll.), Solomons (4 coll.), New Hebrides (8 coll.), Fiji (many coll.).

Habitat & Ecology — Epiphytic or epilithic on different kinds of rock, rarely terrestrial; altitude 150–3200 m, but rarely on the lower altitudes.

32. *Davallia seramensis* Kato

Davallia seramensis Kato, J. Fac. Sci. Univ. Tokyo, sect. 3 Bot., 14 (1989) 223. — Type: Kato, Ueda & Mahjar C-1276 (holo TI; iso BO, L), Moluccas, Ceram.

Rhizome without the scales 1–2 mm diam., white waxy. *Scales* nearly black, with pale border quickly diminishing or disappearing towards the apex, distinctly acicular, often curling backward, not bearing multiseptate hairs, with marginal setae at least in distal part, peltate, 3–5 mm long. Stipes 1–1.5 cm apart, dark brown, not grooved, 3–7 cm long, glabrous or with few scales. *Lamina* simple, one entire to pinnatilobed leaf, glabrous, 8–13 by 0.6–1.5 cm, not or slightly dimorphous. Leaves entire or nearly so, sometimes with some basal lobes, linear. Margin flat or nearly so, not distinctly crenulate even towards apex. Fertile leaves entire or nearly so, sometimes with some basal lobes, linear. Margins not distinctly crenulate even towards apex. Veins in sterile leaves parallel, once or twice branched from the base, reaching the margin. False veins not present. *Sori* separate, at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, about as wide as long, 1 by 1 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin.

Distribution — Malesia: Sulawesi (Minahasa, Soputan Mt, 1 coll.); Moluccas (Ceram, 9 coll.); West New Guinea (Mt Badurti, 1 coll.).

Habitat & Ecology — Epiphyte; altitude 0–1200 m.

33. *Davallia triphylla* Hook.

Davallia triphylla Hook., Sp. Fil. (1845) 162, t. 46a; Bedd., Ferns Brit. India (1865) t. 105; Hook., Syn. Fil. (1868) 94; Bedd., Handb. Ferns Brit. India (1883) 58; Holttum, Revis. Fl. Malaya 2, sec. ed. (1966) 357. — *Stenolobus triphyllus* K. Presl, Epim. Bot. (1851) 99. — *Scyphularia triphylla* Fée, Mém. Foug. 5, Gen. Filic. (1852) 324; Copel., Philipp. J. Sci. 34 (1927) 256. — Type: Cuming 366 (K; iso P), Singapore.

Scyphularia simplicifolia Copel., Philipp. J. Sci. 7C (1912) 64; Philipp. J. Sci. 34 (1927) 256; Hoshiz., Bailey 21 (1981) 50. — *Davallia simplicifolia* C. Chr., Index Filic. Suppl. (1913) 23. — Type: Brooks 133 (BM), Sarawak, Mt Santubong.

Rhizome without the scales 2–5 mm diam., not white waxy. *Scales* nearly black, with pale border quickly diminishing or disappearing towards the apex, distinctly acicular, appressed to rhizome, not crisped, bearing multiseptate hairs at least when young, peltate, 5 mm long. Stipes dark brown, adaxially grooved, 2–8 cm long, glabrous or with few scales. *Lamina* imparipinnate, leaflets entire or nearly so, occasionally

lobed at the base or once branched, or simple, one entire to pinnatilobed leaf, glabrous, not or slightly dimorphous. Leaflets entire or nearly so, sometimes with some basal lobes. Sterile terminal leaflet or simple leaf 9–35 cm by 10–40 mm. Lateral leaflets 6–9 by 0.6–2.5 cm. Margin recurved or revolute, distinctly crenulate to dentate at least towards apex. Pinnae narrowly ovate. Leaflets of fertile leaves entire or nearly so, sometimes with some basal lobes, or pinnatifid. Fertile terminal leaflet or simple leaf 8–28 by 1–4.5 cm. Lateral leaflets 4–8 by 0.7–2 cm. Margins distinctly crenulate to dentate at least towards apex or not. Pinnae narrowly ovate or linear. Veins in sterile leaflets parallel, once or twice branched from the base, reaching the margin. False veins not present. *Sori* separate at the forking point of veins. Indusium also attached along the sides, pouch-shaped, oblong, longer than wide, 2 by 0.5–0.75 mm, upper margin not elongated, truncate or slightly rounded, separated from or even with lamina margin, or protruding beyond lamina margin.

Distribution – Malesia: Sumatra (Aceh, Riouw, Indragiri, Jambi; 5 coll.); Malay Peninsula (Perak, Selangor, Trengganu, Negri Sembilan, Johore; 13 coll.), Singapore (4 coll.); Borneo: Sarawak (4 coll.), Sabah (1 coll.), Kalimantan Timor (8 coll.).

34. *Davallia undulata* (Alderw.) Noot., *comb. nov.*

Parasorus undulatus Alderw., Bull. Jard. Bot. Buitenzorg III, 4 (1922) 317.— Type: *Beguin 1321* (BO; iso L), Moluccas, Ternate.

Rhizome without the scales 1.5–2 mm diam., not white waxy. *Scales* nearly black, without pale border, distinctly acicular, often curling backward, not bearing multi-septate hairs, lacking marginal setae or teeth or those rare, peltate, 3–5 mm long. Stipes dark brown, not grooved, 2.5–5 cm long (winged towards the apex), glabrous or with few scales. *Lamina* simple, one entire leaf, glabrous, 6–17 by 1 cm, not or slightly dimorphous. Fertile leaf 7–20 mm broad. Veins in sterile leaves parallel, once or twice branched from the base. *Sori* connate, elongate along leaf margins.

Distribution – Malesia: Moluccas (Halmaheira, Ternate 1 coll., G. Sembilan 1 coll.).

Habitat & Ecology – Epiphyte; altitude 600 m.

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Numbers refer to the species number as used in this article. New names and combinations have been printed in **bold type**, other accepted names in roman type, and synonyms in *italics*.

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